JUNE
1937

EMBER

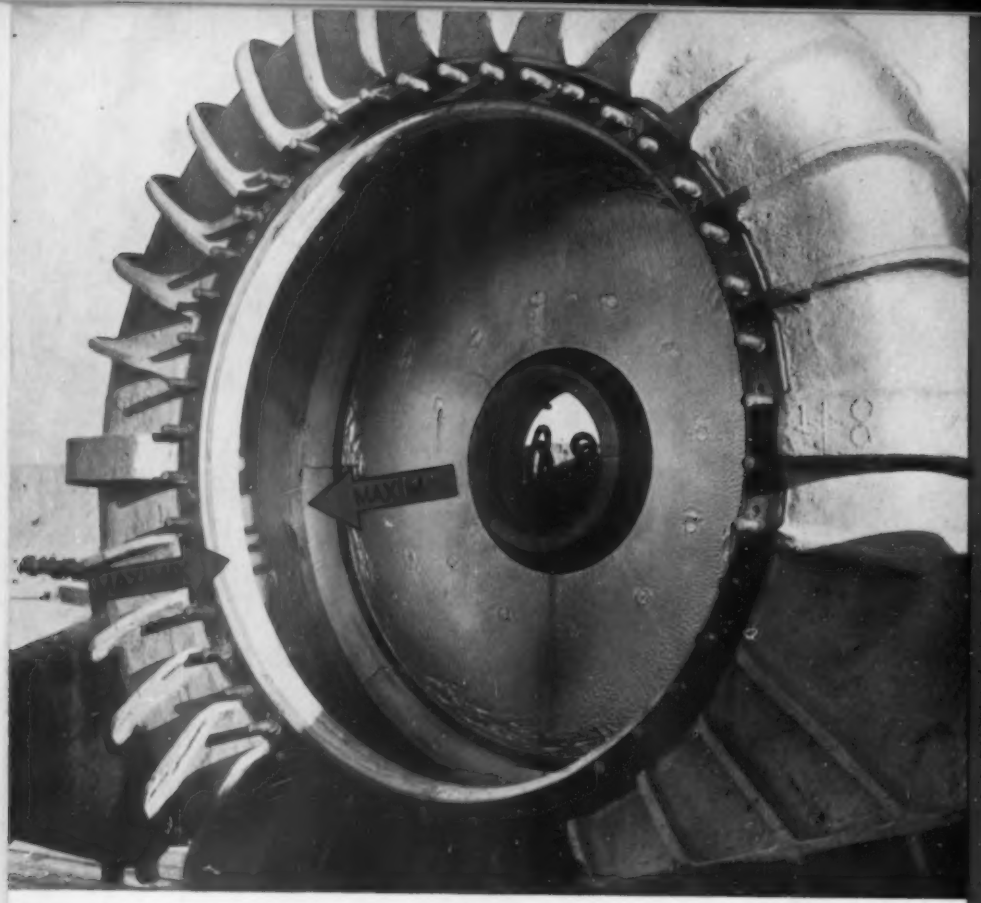
Rock Products

WHICH IS CONSOLIDATED WITH THE JOURNALS

CEMENT and ENGINEERING NEWS (Est. 1896)

CONCRETE PRODUCTS (Est. 1918)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY



Comparison of MAXIMIX RUBBER with METAL after Pumping 1,200,000 yds.

Two pumps in the same line, one pump with Maximix Rubber Parts and the other with similar parts of the hardest, practical alloy steel. Both pumps handled 1,200,000 yards of the same material. Maximix Rubber (indicated by colored arrows) shows practically no wear, while the equivalent metal parts (indicated by white arrows) are worn to the extent that they require replacement with new "more-expensive-than-rubber" parts . . . The side plate liners and other parts of the Hydroseal Dredge Pump are moulded of Maximix Rubber, which generally outlasts metal three to six times. The Hydroseal Principle of introducing clear water on each side of the impeller invariably saves 35% in pumping power costs. Address the nearest office listed below for a copy of new Catalog No. 3-836.

HYDRO SEAL
Dredge Pump *MAXIMIX* Protected

HYDROSEAL AND MAXIMIX DESIGNS ARE COVERED BY PATENTS AND APPLICATIONS IN THE MAJOR MINING CENTERS OF THE WORLD

The ALLEN-SHERMAN-HOFF CO. · 221 South 15th Street · PHILADELPHIA, PA.

OFFICES AND REPRESENTATIVES IN MOST PRINCIPAL CITIES

Rock Products

Which is consolidated with the journals

CEMENT and **ENGINEERING NEWS** **CONCRETE PRODUCTS**

Founded 1896 Est. 1918

Entered as second-class matter, Jan. 30, 1936, at the Chicago, Ill., postoffice, under the Act of March 3, 1879.

(PUBLISHED MONTHLY)

RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD

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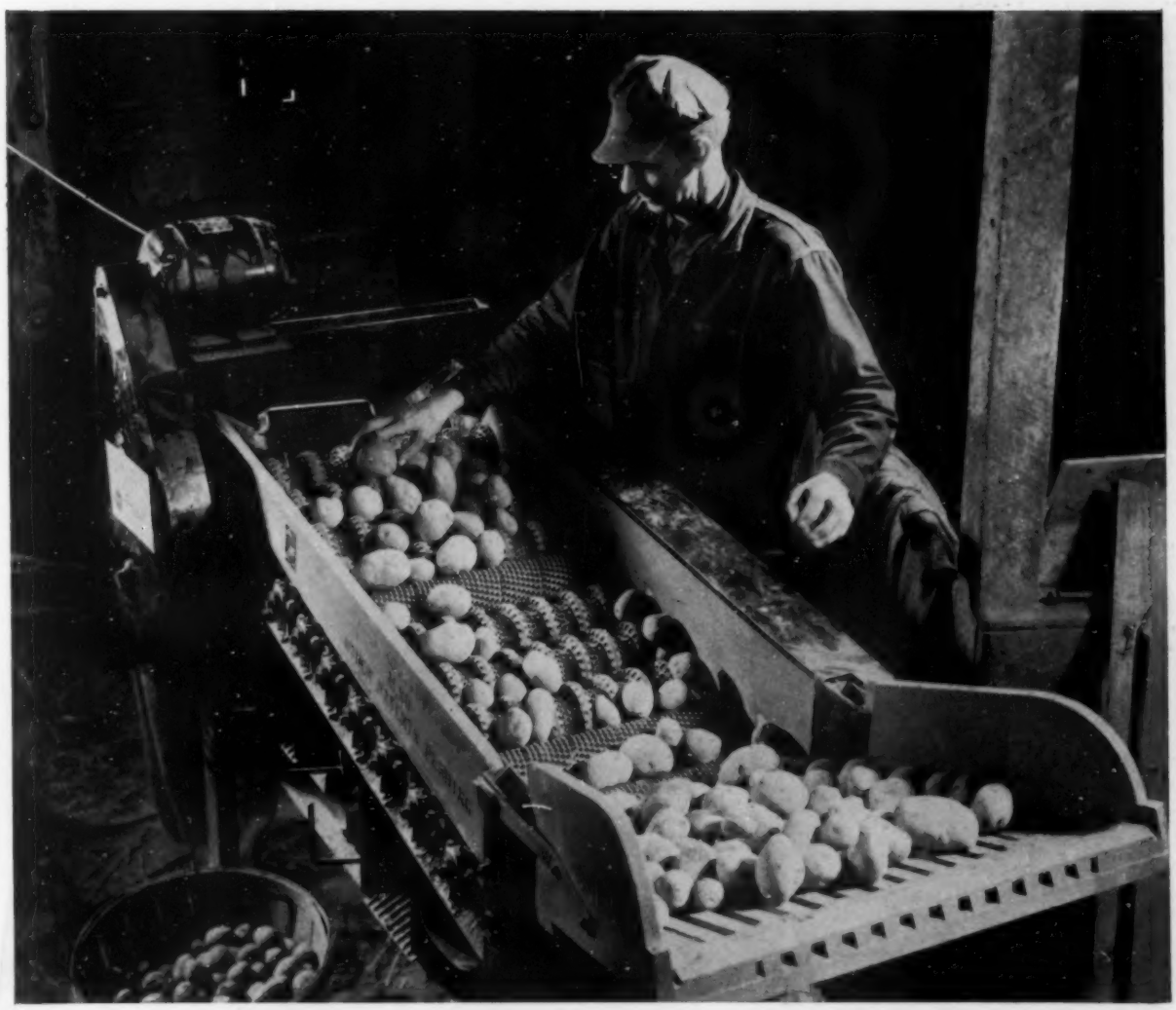


THE MACHINE THAT SHUFFLES AND DEALS POTATOES

A typical example of Goodrich development in rubber

HOW would you like to sort into their market grades 15,000 bushels of potatoes every fall?

An Ohio farmer boy had an idea. Why couldn't mechanical fingers, made of bristles, do the work? Mounted on pairs of discs, each pair set farther apart, the potatoes could be raked over the assembly, which automatically separated them according to size.

A farm machinery maker heard of the boy's idea, sent designers to the farm, and produced a finished machine. But the mechanical fingers wore out, broke off.

Then someone came to Goodrich, where engineers soon had a rubber compound that does the work and stands the gaff. The fingers of special Goodrich rubber grade the potatoes perfectly, without injury, and clean them as they go. Result is lower cost to the farmer, an easier life for farmer boys, and better looking potatoes which bring a better price.

The problem in this machine was to develop a rubber which would stand long flexing, compression with a tearing action, and constant abrasion of sand and grit. Goodrich could and did find such a rubber, because of successful research work in developing rubber compounds for equally severe duty in belts, hose, chute linings, bearings.

Constant Goodrich research work on standard products puts this Company in better position to handle the unusual jobs, and the tough problems of unusual applications often uncover rubber improvements which can be applied to standard products. It's a never-ending circle of improvement—to the benefit of every user of products made by The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *products problems* IN RUBBER

Every quarryman, responsible for results from equipment, will benefit from reading our 32-page Crater booklet. Shows where to use Crater, and just how. Profusely illustrated . . . and FREE to all.

YOUR shovels and drag-lines will perform at peak . . . when you lubricate their gear teeth and wire rope with Texaco Crater.

This lubricant is different. It kills immediately the nerve-racking noise of gear teeth. Cushions the teeth in a tough, wear-defying film that lasts several times longer. Saves hours of replenishing time, and prevents wear.

Used on wire rope, Crater coats each individual wire with a weather-proof film that clings despite high running speeds over small-diameter sheaves.

Many gear and rope greases frequently squeeze out, ball up, throw off.

Trained lubrication engineers are available for consultation on the selection and application of Texaco Petroleum Products. Prompt deliveries assured through 2020 warehouse plants located throughout the United States. The Texas Company, 135 East 42nd Street, New York City.

TEXACO

TEXACO *Industrial Lubricants*

Job Engineers Specify Concrete Mixed with JAEGERS!

• *In* CINCINNATI

There's a reason why engineers in Cincinnati, and from coast to coast, prefer concrete mixed with Jaeger Truck Mixers:

Jaeger's 100% accurate water control—exclusive Dual-Mix action with the Jaeger double-end-cone drum — Dual-Mixing speeds to compensate for long or short hauls—fast, 2-speed discharge with complete absence of segregation and complete self-cleaning—these features mean concrete of recognized superior quality, workability and higher ultimate strength.

Users will also tell you that Jaeger's light weight and long life, because of highly developed design and the use of Man-Ten Alloy Steel, cut repair bills on mixers and trucks—save on tires—save on gas—help bring operators the maximum profit that comes from low cost operation.

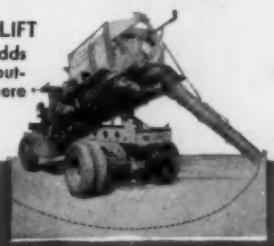
Because these features assure dependable, economical delivery of the finest concrete, more ready-mixed concrete is being delivered with Jaeger Truck Mixers than by any other method. In towns under 10,000 up to largest cities, Jaeger equipped plants are building bigger business and earning prosperity incomes for their owners. Write for catalog and information that will help you plan for a bigger share of this fast-growing market.

Pioneer Truck-Mixer User Tells of JAEGER Experience . . .

"Writer was original transit mix operator in Cincinnati metropolitan area. Since 1929 have bought 30 Jaeger mixers. Original 15 units, bought in 1929-30, poured over 300,000 cu. yds. of concrete in 3½ year period and are still in first class condition, good for indefinite service. To take care of peak pours have rented other makes of transit mixers. Several times engineers in charge asked us to put the rented equipment on other work as they preferred concrete produced by our Jaegers. Jaeger service on repair parts necessary on any mechanically operated unit is prompt. Very pleased to have you use my name as a satisfied user." The Howard Concrete Producing Company, Cincinnati, O.

THE JAEGER MACHINE CO.
603 DUBLIN AVE., COLUMBUS, OHIO

HIGH REAR LIFT
Attachment adds 75% more spouting area where needed.



JAEGER TRUCK MIXERS

GIVE THEM
TIMKEN
ROCK BITS

Give your drillers the faster penetration and longer life of TIMKEN Bits and they will give you more work for their day's pay—and without any greater effort.

There is no advantage in sticking to forged steel in the face of the *proved* economies of TIMKEN Bits. The longer you do so the more you will lose. Progress will not be denied, and nowhere is this fact more apparent than in the construction industry.

You wouldn't think of employing men with shovels to do all of your digging—or horse-drawn wagons to do your dirt hauling. And yet the contrast between the old and new methods of rock drilling is somewhat similar as regards efficiency.

In TIMKEN Bits the modern removable feature is seen at its best, plus the fast-drilling, wear-resisting qualities of deep-hardened TIMKEN Steel. You can't beat that combination. Write for further information and name of nearest distributor.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

TIMKEN
ROCK BITS

used at Chemical Lime Company, Bellefonte, Pa.,—

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Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

Welded or Riveted Stacks, Tanks and Bins for any purpose.

TRAYLOR-CHEESMAN BURNER

When the Chemical Lime Company at Bellefonte, Penna., designed its new chemical lime plant, it made a wise decision to use the Traylor-Cheesman Kiln-Cooler-Burner System. The Traylor Kiln is 8'6" dia. and 400'0" long,—the longest rotary kiln to go into lime-manufacturing service up to this time. The Traylor-Cheesman Multiple-Tube Rotary Cooler is 5'6" dia., 42'0" long.

The Traylor-Cheesman Double-Tube Burner, using pre-heated air from the Cooler, accurately controls combustion throughout the entire length of the Kiln. The combined system assures high efficiency, a high quality of product and large capacity.

Our Bulletin No. 116 fully describes these units, which should interest all lime and cement manufacturers, and we will gladly send it on request. However, a better way is to have our experts around to discuss your problems. They are on call, any time!

How About Writing Us? TODAY!

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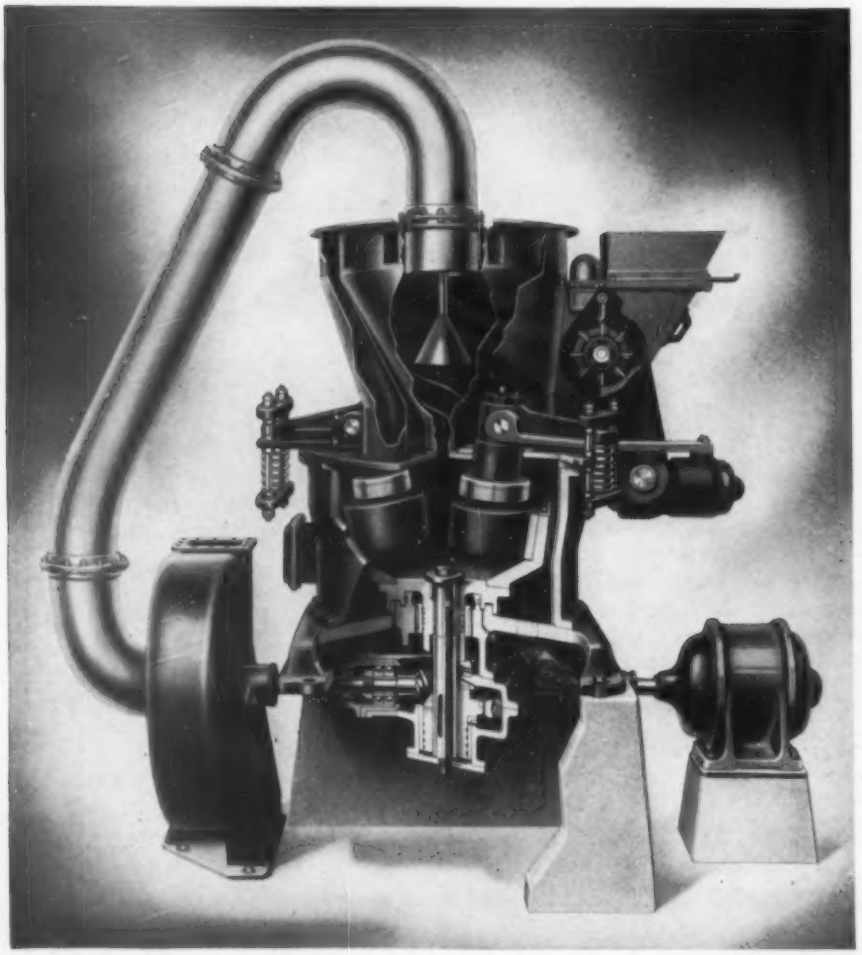
First BOWL MILL sells Ten more

THE greatest tribute to the efficiency of the Bowl Mill is the large number of repeat orders. As a direct firing unit for rotary kilns, it has outsold and outdone all other types of equipment. About two years ago, when the Bowl Mill was put on the market, a progressive manufacturer of lime products selected this advanced type of coal grinding unit for firing a rotary lime kiln. It gave such satisfactory operation that he installed at intervals ten more Bowl Mills at various plants—totaling eleven Bowl Mills to date. The ratio of coal used per ton of material produced is so much less than with previous methods that the resultant savings are rapidly paying off the investments.



Latest model of Raymond Bowl Mill for grinding coal and direct firing rotary cement and lime kilns. Equipped with double cone separator and automatic feeder with variable speed drive. One standard constant speed motor drives both mill and fan. New principle of design eliminates metal-to-metal contact and all noise and vibration.

Eleven Operating for One Company

•

First Bowl Mill installed by this company in 1935 at its eastern plant.

•

Six months later, a second mill bought for one of its western plants.

•

Within next six months, two more purchased for western plant and three more mills for another eastern plant.

•

Late last year, still another plant equipped with a Bowl Mill, followed by three additional mills recently ordered.

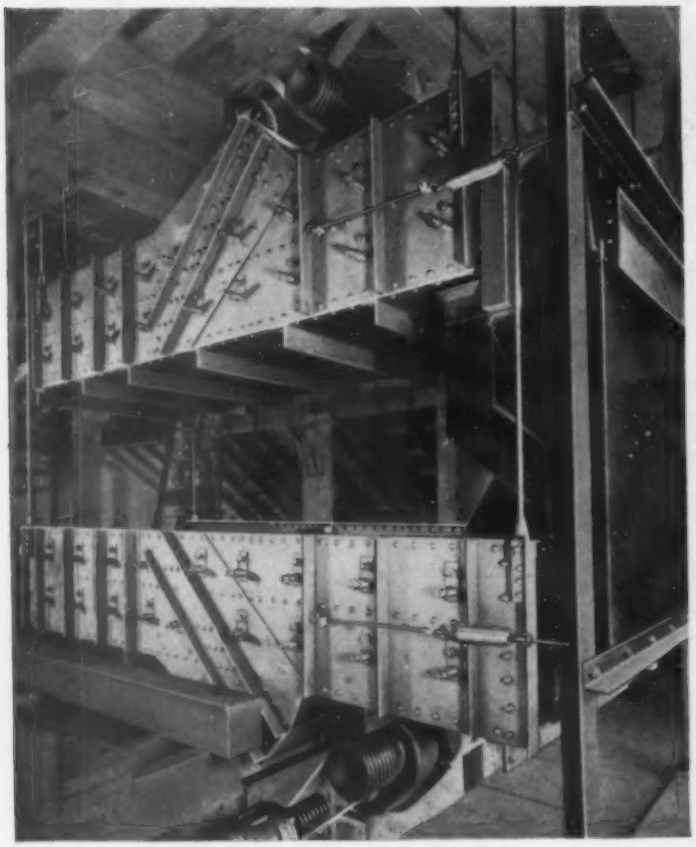
•

Write for Bulletin No. 29—"Proof of Bowl Mill Operating Records."

RAYMOND PULVERIZER DIVISION
1307 North Branch Street, Chicago
COMBUSTION ENGINEERING COMPANY, INC.

Sales Offices in Principal Cities - - - - - - - - - In Canada: Combustion Engineering Corporation, Ltd., Montreal

WHERE HEAD ROOM COUNTS YOU NEED LOW-HEAD SCREENS



Two 5' x 14' Double Deck, Heavy Duty, Low-Head Vibrating Screens Installed in a Coal Preparation Plant

762-A

The new Allis-Chalmers Low-Head Horizontal Vibrating Screens give you greater screen area in less space . . . greater tonnage of accurate size product at lower cost than older, slower moving type of screens.

Low-Head Screens, as the name suggests, take very little head room. They operate in a horizontal plane and can be installed one right under another as illustrated. This often saves expensive remodeling to obtain greater screen capacity.

Low-Head Screens are built with single, double or triple decks from 3'x6' to 6'x14' or larger. They are described in Bulletin 1478. Write for your copy. Or better still, let us show you one of these modern screens in operation.

EQUIPMENT ENGINEERS TO INDUSTRY

ALLIS-CHALMERS

MILWAUKEE WISCONSIN

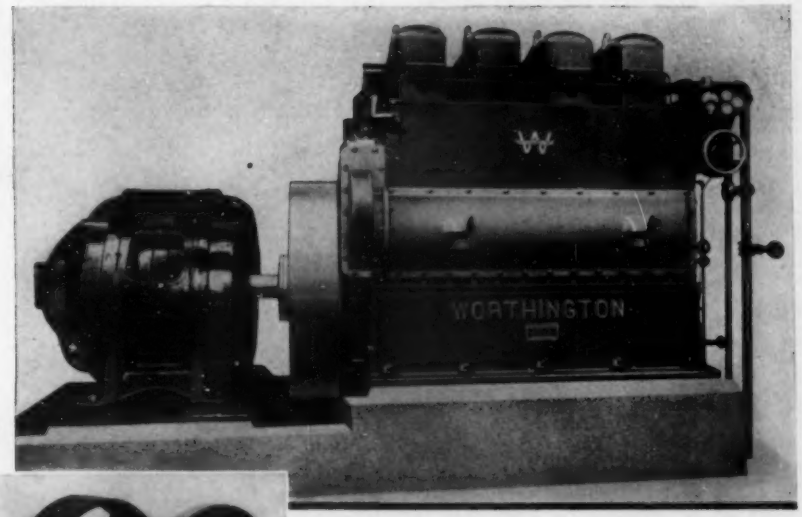
WORTHINGTON EQUIPMENT

for the

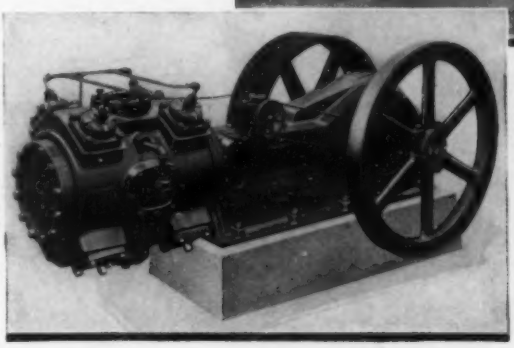
ROCK PRODUCTS INDUSTRY

•

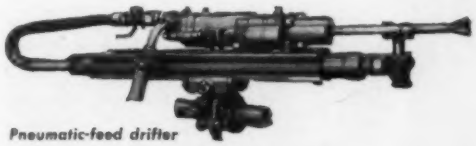
One maker . . .
undivided
responsibility



120-hp. Worthington totally-enclosed Diesel engine, direct-connected to generator. Worthington Diesel engines are built for continuous heavy duty operation at medium speeds . . . 50 to 1500-hp. . . . and for every type of drive. A complete line provides the correct unit for every individual condition . . . and Worthington air compressors for starting, rotary pumps for fuel transfer, and centrifugal pumps for jacket cooling, give additional service security through the undivided responsibility of one maker

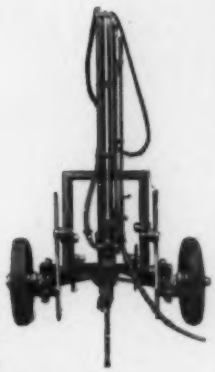


Single horizontal air compressor. One of a complete line . . . in a wide variety of arrangements and for all capacities, from the smallest to the largest



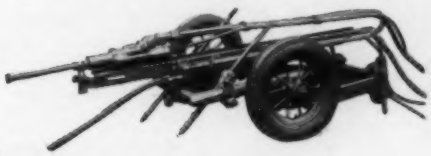
Pneumatic-feed drifter

Screw-feed drifter



The ROCK MASTER . . . drills at any angle. Steel rims . . . or pneumatic tires for easy towing

Rock Hammer



THE equipment shown here illustrates but a small part of the complete Worthington line . . . one which has earned an enviable reputation among users for delivering full performance and for standing up under the severest conditions.

Each unit embodies the correct engineering, high-grade materials and careful workmanship for which Worthington is widely known.

To specify Worthington is to be assured of an extra measure of protection against production delays.

• *Literature available*

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IG7-24

THE ROCKWELL TEST, *made regularly in our laboratory, checks gradation of hardness of USS Lorain Grinding Balls to assure uniform grinding and long service.*

MEASURED TOUGHNESS

PRODUCTION of USS Lorain Grinding Balls is definitely controlled right through to the finished product. These balls are forged from Carnegie-Illinois *controlled steel* which has been rolled to pre-determined specifications. They are forged by experienced workmen . . . with modern equipment.

Precision in heat-treating processes is carefully guarded to produce grinding balls that are hard enough to withstand abrasion over a long period of time and yet resilient enough to prevent splintering. Long life and maximum grinding effectiveness are assured by constant checking during production and by routine laboratory tests on samples of each production. This is your guarantee that USS Lorain Grinding Balls are made *right* . . . suited to the tough wear of your grinding processes.

Specify USS Lorain Grinding Balls. They are available in the following sizes: ½", ⅝", ¾", ⅞", 1", 1¼", 1½", 2", 2½", 3", 3½", 4", 4½", and 5".

• OTHER LORAIN PRODUCTS

Mill Liners and Screens of High Carbon Rolled Plate, Manganese, Chrome Nickel, Chrome Nickel Molybdenum, and plain Carbon Steel or Hard Iron; Hammers for Swing Hammer Mills, Industrial Cars, and Trackwork.

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CARNEGIE-ILLINOIS STEEL CORPORATION

Lorain Division — *Johnstown, Pa.*

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UNITED STATES STEEL


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The pacemaker in
wire rope development
JAR
THE most exacting basis for judging wire rope performance is AVERAGE SERVICE.
This is the basis advocated by Roebling, in which rope cost per ton of material handled, or per other unit of service measurement, is based not on the service of a single rope but on the *average* service of several ropes.
John A. Roebling's Sons Co.,
Trenton New Jersey

"PUT THAT *Cleveland* ON THIS STUCK STEEL"

Time and again Cleveland drills are called upon to loosen up drill steels that otherwise would have to be shot out. Cleveland sinkers keep the cuttings cleared away from the bit and blown out of the hole, so that the drill steel is free to be withdrawn at all times. Clevelands are powerful in rotation, too, and that helps to keep steels from getting stuck.

Good hole blowing insures keeping cuttings away from the face, permitting the bit to operate always on virgin rock. That, and the strong rotation, promote rapid drilling, which means more footage for you. Let us send Bulletin 110 which gives the essential information on the whole Cleveland line.

• The Cleveland H11 is a winner in either hard or soft rock. It is fully described in Bulletin 118.

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Cable Address: ROCKDRILL

LEADERS IN DRILLING EQUIPMENT

lo Viego y lo Nuevo

WHICH IN ENGLISH MEANS

THE OLD AND THE NEW

About two hundred miles west of Mexico City lies the town of Morelia. Two hundred years ago they built this aqueduct to bring the water from the mountains to the city. It is no longer in use, but still stands as a monument to the expert craftsmanship of the ancient times.

Today, a road is being built through the quaint old city of Morelia. It will eventually extend from Mexico City, through Morelia, Guadalajara, Mazatlan, on the Pacific, and then north to California. This road is a monument to the new age of good roads, automobiles and modern machinery.

It is only right that the crushing equipment used on this road should be the latest in design and the finest in construction. It is the new Pioneer 36-V Duplex Quarry Plant.

Pioneer Equipment is used all over the world — helping to build better roads and thereby doing its part in making this world a better place in which to live.

PIONEER 36-V DUPLEX QUARRY PLANT

The Pioneer 36-V Duplex Quarry Plant consists of a 15"x36" Primary Crusher — 30"x8' Vibrating Screen — 30"x18" Secondary Roll Crusher — all mounted on portable trucks with Caterpillar Diesel Power and Pioneer Belt Conveyors and Storage Bins.

PIONEER

GRAVEL EQUIPMENT MFG. CO.

MINNEAPOLIS, MINNESOTA

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- Scientific and practical results—based on the greatest experience in the oil industry.

How to put this Knowledge... part of Socony-Vacuum Lubrication Service... to work in your Plant

IT HAS TAKEN 71 years to gather, correlate and file the tremendous lubrication knowledge Socony-Vacuum offers industrial men.

The scientific and practical information it provides is worth literally millions of dollars to American industry, for it points the way to decreased power consumption, lowered maintenance expense, improved production methods, smaller annual oil bills.

It will pay you to take advantage of this knowledge and experience—when Socony-Vacuum representatives call at your plant.

SOCONY-VACUUM

INDUSTRIAL LUBRICATION

GARGOYLE Lubricants

SAVES MONEY FOR INDUSTRY

Read what 71 Years' Lubricating Experience...the Greatest in the Oil Business...can do for You. See Next Page.

GARGOYLE INDUSTRIAL LUBRICANTS

ARE FIRST CHOICE OF AMERICAN INDUSTRY

36 of the 50 leading Pulp and Paper Manufacturers.

80% of the country's leading Machinery Builders.

81% of the leading Automobile and Truck Manufacturers.

69% of the leading Automotive Accessory Manufacturers.

74% of the leading Tire and Rubber Manufacturers.

66% of the leading Iron and Steel Fabricators.

62% of the leading Iron Mines, Smelters and Rolling Mills.

50% of the Steam Turbines rated 5000 KW. and over.

50% of America's Reciprocating Steam Engines.

100 Leading Railroads.

65% of the World's Diesel-Driven Ships.

SEND FOR THE SOCONY-VACUUM MAN

Services of trained Socony-Vacuum Engineers are available at all times in helping your men to solve lubrication problems.

SOCONY-VACUUM OIL CO.

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STANDARD OIL OF NEW YORK DIVISION · WHITE STAR DIVISION · LUBRITE DIVISION · WHITE EAGLE DIVISION
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GARGOYLE Lubricants

what have HERCOMITE *and* GELAMITE *to do with* A SKYSCRAPER?

All are modern . . . and give you more for your money

The skyscraper gives more value because it has more floor space on the same ground area. Likewise, Gelamite* and Hercomite* give more value per cartridge. That's why Gelamite and Hercomite are rapidly replacing older types of explosives for metal mining, construction, quarrying, and all-round blasting. « » Hercomite is saving money on many operations; it replaces older types of explosives at a saving of 6% to 24%. « » Gelamite, too, is saving thousands of dollars in replacing gelatins. This replacement usually results in a reduction of 15% to 20% in explosives costs. « » Just as the skyscraper is revolutionizing construction, so Hercomite and Gelamite are revolutionizing blasting.

*Reg. U. S. Pat. Off. by Hercules Powder Company.

EXPLOSIVES DEPARTMENT

HERCULES POWDER COMPANY
INCORPORATED
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A-43

KOEHRING

251 SHOVEL

High speed excavation with the Koehring 251 Excavator is assured by the many modern features of this popular ⅝ yard shovel. Light weight, high line and selective swing speeds, highly responsive clutches, and anti-friction bearings are important factors contributing to high production.

KOEHRING COMPANY

Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

THE RIGHT GRINDING MACHINE
• FOR EVERY NEED •

In the list below of grinding and pulverizing machinery that we manufacture there is a machine which will meet the requirements for the reduction of your materials.

KOMINUTER for straight granulating. **TUBEMILL** for straight pulverizing.

UNIDAN multi-compartment mill, combining granulating and pulverizing.

UNIKOM multi-compartment mill with overhung preliminary grinding chamber, combining granulating and pulverizing.

TIRAX multi-compartment air swept mill for drying, granulating and pulverizing coal, etc.

ATOX air swept high speed, vertical shaft, pulverizer.

● If your problem is wet grinding or dry grinding—open or closed circuit—gravity discharge or air swept—combined drying and grinding—direct firing or bin system—one of the machines above will meet the requirements either alone or in conjunction with our separators or classifiers, so that practically every condition can be met.

● In addition to the above machinery we manufacture also a complete line of accessories for the grinding operation such as air separators and classifiers, Trix wet separator, fans, liners, grinding bodies, spray casings, symetro gear boxes, feeders, conveyors, pumps, dust casings, washmills, etc.

An experience of over 50 years in the grinding of miscellaneous materials is available for the solution of your grinding problem.

●

F. L. SMIDTH & CO.

Designers of Cement Making Factories
Manufacturers of Cement Making Machinery

225 BROADWAY **NEW YORK, N. Y.**

AIR HOSE CAN'T BE A "SISSY" IN *Rough* COMPANY

PNEUMATIC Air Hose must be able to stand up whenever and wherever the going is toughest.

Thermoid engineers learned this years ago from observation and test in actual quarry operations. They've proved to hundreds of purchasing agents that even the cost of air hose has a definite bearing on the cost per ton of rock sold. And that doesn't mean *first* cost. You can only calculate the per foot cost of air hose by figuring in its length of life—its months of dependable service.

Experienced quarrymen play safe by specifying a grade of air hose which they know can "take it". The rubber compound and fabrics used in Thermoid Air Hose write their own best advertisement in the longer service which they give *per dollar invested.*

Thermoid RUBBER

DIVISION OF THERMOID COMPANY, TRENTON, N. J.

BELTING · PACKINGS · BRAKE LININGS · HOSE

HAISS **Truck Loading News** ★★★★★

Recording the 45th Year of Building Equipment of Demonstrable Superiority

A BUSY SPRING • 1937 . . . . . AND A BUSY SUMMER

BIG NEW LOADERS
SHOW WHERE HAISS EXCELS

Heavy Duty Use Proves Worth of Standard Design Features

Quarrymen and gravel producers have now put both the 8-yd. Model "135" and the 5-yd. Model "80" through their paces over a tough road. They've pushed them hard through a busy season. They've given 'em the works—and don't hesitate to tell us they're GOOD. That's no news; except in size they're just like the Model "27", and every man that ever used a "27" will tell you that it does more work, with less trouble and lower upkeep than he'd ever believed possible. That's why we wish every man who has an opinion about Loaders would talk to a Haiss user. Then he'd know how much more profitable it is to have a machine with:

1. Haiss patented revolving propeller feeding device.
2. Haiss slow-speed, worm driven crowd.
3. Haiss manganese steel chain, paddles, tread links and other parts.
4. Haiss long-life electric steel sprockets.
5. Haiss easy-to-operate balanced elevator.
6. Haiss simplified controls.
7. Haiss built Loader transmission with broad-faced gears and compression-band clutches in an enclosed oil-bath case—where grit cannot get at them and daily adjustment is unknown.
8. Haiss heavy-built chassis and rigid braced elevator.

Any man who has trucks to load will do well to look into the extra value he will get in a Haiss Loader and how much he will save over the next 2 years or the next 500,000 yards.

"The Best Bucket Haiss Ever Built"

That's the way they talk of the new Hi-Power, with its penetrating digging bite and full-load grab. The secret is in the concentration of weight where it accomplishes maximum work effort—and the Hi-Power reeving of the closing line. Up to 6 or 8:1 where the digging is tough.

But the pay-off is in the bucket's STRENGTH—for no bucket is any better than its ability to close true and tight. Super bowl strength is making the Hi-Power famous! Check "Buckets" on the coupon.

A Complete Line of Loaders

As trucks and truck bodies have gotten bigger, so have Haiss Loaders. As big as your trucks are you can still load and dispatch at the rate of one every 2 minutes, or better. That's high speed loading, which is what you need when the trucks line up. Truck time costs money and it's sound business to have a BIG Loader, even if you need its full capacity only in spurts.

Whether they're your own trucks or a customer's, it's up to you to keep 'em on the go. That's where they earn their keep —ON THE ROAD, and not idling in a stockpile traffic jam. Truck time saved will go a long way toward paying for a high-capacity Loader. *Check your choice, on the coupon below.*

GEORGE HAISS MANUFACTURING CO., INC.
Park Ave. & 143rd St., New York

Please send me your latest catalogs on the Loaders checked:

- ☐ ***MODEL 135—5 to 8 yds. per min.***
- ☐ ***MODEL 80—3 to 5 yds. per min.***
- ☐ ***MODEL 27—2 to 3 yds. per min.***

Send me also your catalogs on:

- ☐ ***Hi-Power Clamshell Buckets for Excavating***
- ☐ ***Haiss Portable Belt Conveyors***

Name .....

Street .....

City .....

HUSKY FRONT ENDS for Tough Digging

CUBIC 3/8 YARD

CU. 3/4 YD.

CUBIC 1/2 YARD

5/8 CU. YD.

HERE IS THE BUSINESS END OF A NORTHWEST MODEL 15 - 3/8 YD. SHOVEL

Ruggedness IS WRITTEN ALL OVER IT

The boom—welded and designed to overcome digging conditions far harder than the ordinary small shovel can meet. (Remember no *Northwest* welded boom has ever failed).

The stick is welded—and the full 3/8 yd. struck measure dipper has a manganese front.

Behind this is the Northwest Independent Crowd—the crowd that utilizes power other shovels waste! This design is characteristic of all Northwests. They have the toughest front ends on any shovel, size for size. Altogether they are the finest pieces of equipment of their type and capacity on the market today—and we can prove it!

NORTHWEST ENGINEERING COMPANY
1820 Steger Building 28 East Jackson Boulevard
Chicago, Illinois

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES 3/8 yd. capacity and Larger

NORTHWEST

SHOVEL • CRANE • DRAGLINE • TRUCK SHOVEL • TRUCK CRANE

We ask you to test

WILLIAMSPORT PURPLE STRAND "Form-Set"

To decide on the wire rope that serves you best—handles more work because it lasts longer—we urge you to try Purple Strand "Form-Set," *pre*formed the Williamsport way.

This rope serves better and lasts longer: it is more compact, tougher, and has less internal stress. Compact, because the wires lay up tighter, without interstices, for each wire is exactly uniform—drawn through our Carboloy dies that always cut to the same micrometer precision. Tougher, because the wires have the highest tensile strength and they seat more firmly in the core. Less internal stress because "Form-Set" is *pre*formed the Williamsport way—resists wear better, lasts longer.

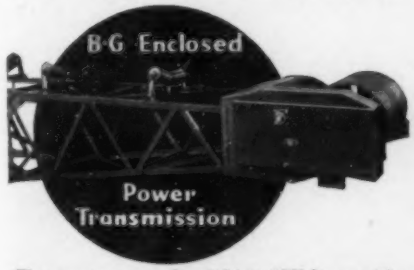
We invite you to test Purple Strand "Form-Set" on the toughest job you have. Note its performance, compare its service record, and save with its greater endurance. Will you try this better rope?

WILLIAMSPORT WIRE ROPE CO.

WILLIAMSPORT, PA. 122 So. Michigan Ave., CHICAGO, ILL.
Other Offices in All Principal Cities

Via Barber-Greenes

Here are two new Barber-Greenes doing a perfect job in an ideal plant.



The conveyor on the right is 160' long, with a Barber-Greene steel truss 42" deep. This conveyor not only has fairly long spans but carries an 8" water pipe in addition to the walkway.

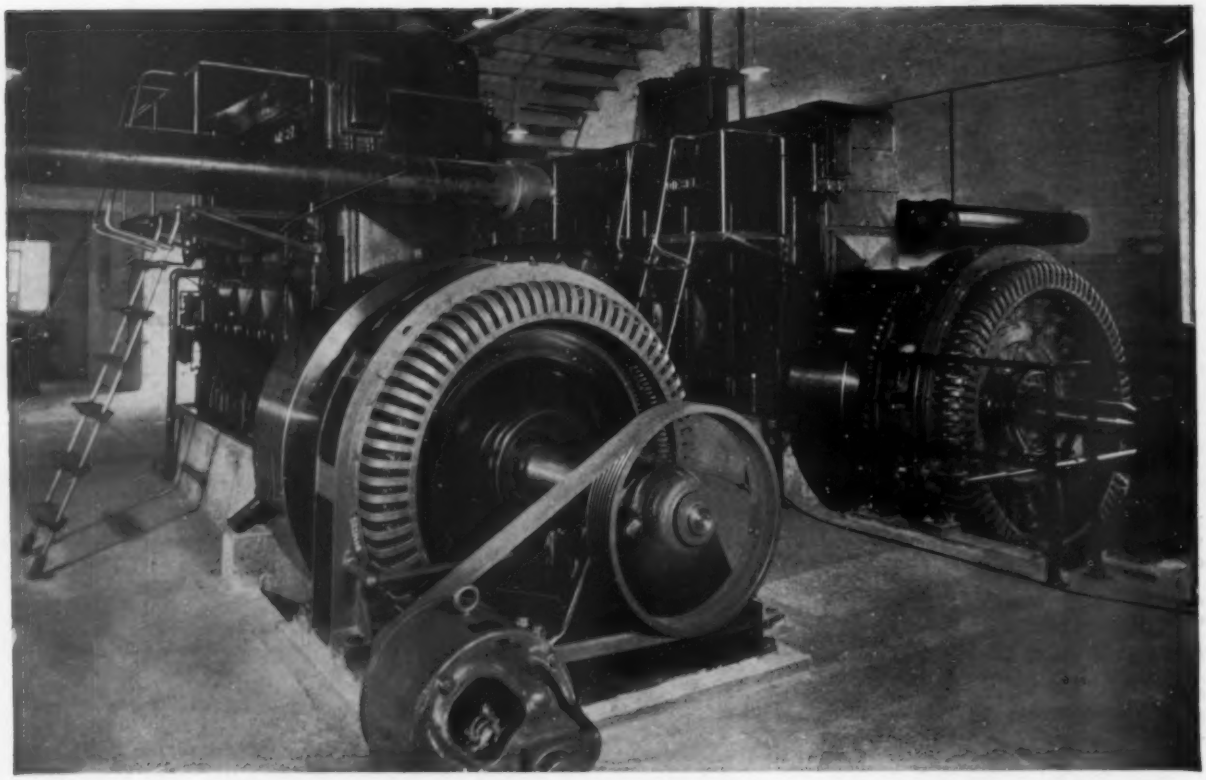
The left conveyor, which runs horizontally just above the ground, is mounted on wood stringers as no long spans are necessary.

Both conveyors are driven by the new Barber-Greene enclosed transmission, an all-welded steel unit, dust tight, internally lubricated. This transmission is available in two sizes, has highest quality anti-friction bearings and precision-made steel gears and sprockets.

The new Barber-Greene 42" deep welded steel truss has all the well known B-G advantages, standardized sectional construction, quick easy erection, etc.

The carriers on both conveyors are the finest made by Barber-Greene: Unbreakable, all-welded steel base, end brackets die formed, oversize Shafer Self-Aligning Roller Bearings. FOUR pass labyrinth grease seals keep the grease in and grit out.

The carriers alone justify your inquiry. Send a card or letter today for full information on Barber-Greene conveyors. Remember we maintain a department for the sole purpose of solving your material handling problems the most efficient, economical way. There is no obligation. *Barber-Greene Company, 459 West Park Avenue, Aurora, Illinois.*



DIESEL OPERATING COST IS LOW IN QUARRY AND CRUSHING PLANTS

Superior Diesels are the answer to the power problem in many quarries and rock crushing plants where power represents one of the major costs of production.

A typical example is this plant of St. Genevieve Lime and Quarry Company at Mosher, Missouri, where two Superior Diesels of 750 and 375 horsepower are producing power for 7.23 mills per K.W.H. and showing a saving in "out of the pocket expense" of over $900 every month. A third Superior Diesel of 180 horsepower is now being added to this plant for air compressor drive.

A free power survey may show equal or greater opportunity for savings in your plant — and how this may be realized without large cash outlay. Ask us for details. Large or small Superior Diesels are available for any size plant.

THE NATIONAL SUPPLY COMPANY
OF DELAWARE
SUPERIOR ENGINE DIVISION
LOS ANGELES, CALIFORNIA SPRINGFIELD, OHIO PHILADELPHIA, PA.

Superior DIESELS

HEAVY DUTY MODELS: 50 to 810 H.P., 250 to 720 R.P.M. • HIGH SPEED MODELS: 25 to 150 H.P., 1200 to 1800 R.P.M.

LORAIN 87 TOPS OFF BUSY DAY WITH NIGHTLY "STRIP ACT"

DURING the day this Lorain-87 shovel of the Union Limestone Company loads out as much as 340 cars of rock in 7 hours' working time. But that is only half its job. When the evening whistle blows, this shovel moves on up to the top of the quarry where it spends the night in stripping service.

It is on tough, unusual jobs such as this that Lorains show up to best advantage. Built to the Center Drive design, these machines not only have the power and stamina to produce big tonnage consistently but offer the necessary mobility required for all-purpose quarry service.

That's why Lorains of 2 to ⅜ cu. yd. are preferred by those operators who want to keep material handling costs at rock bottom.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

THEW CENTER DRIVE REG. U.S. PAT. OFF.

LORAINS
MOVE MORE MATERIAL, FASTER AT LOWER COST

CU. ⅜ to 2 YD.

Get a Gilmer V-Belt and get...

GILMERS — Gilmers only — give you *Gilmer grip.* A Gilmer V-Belt fits the groove because it *has* to fit. Gilmer grip locks it in working position there. That makes PULLING POWER.

Notice the way the *straight sides* bulge as a Gilmer V-Belt flexes around the sheave. It bulges along its whole width. (See white arrows.) The steel sidewalls distribute this bulging over both of the belt's side surfaces. (Indicated area.) A Gilmer pushes against the sheave walls. This pushing creates pressure — grip — POWER.

All this lateral stress, exerted across the full thickness of the belt, locks a Gilmer V-Belt in working position. The belt hugs the pulley. So Gilmers don't slip. Gilmer V-Belts don't waste power.

L. H. GILMER COMPANY, Tacony, Philadelphia
"THE OLDEST FIRM OF RUBBER FABRIC BELT SPECIALISTS"

FIVE FAMOUS FEATURES OF GILMER V-BELTS

1. Top Rubber—Tough tension rubber. Eliminates "misfits."
2. Pulling Cords—Patented construction. Concentrates power.
3. Bottom Rubber—Heat-resisting. Created by Gilmer. Exclusive.
4. Double Jacket—Bias-woven fabric. Triples belt's life.
5. Controlled Stretch—Pre-tested, to insure permanent matched working lengths.

FREE Gilmer V-Belt Catalogue. Send today for yours.

Use Gilmer Single Strand V-Belts for POWER on f. h. p. jobs.

Here's a Good Way to Go into the
READY-MIX BUSINESS

WITH A DEMOUNTABLE REX MOTO-MIXER

General hauling and delivery work in the morning—transporting, mixing and placing concrete in the afternoon—a typical working day for the truck owned by this enterprising firm. And it has already saved them hundreds of dollars in the investment and operating cost that would be necessary with two trucks.

When a general-duty truck is wanted, the Rex Moto-Mixer is quickly unclamped—easily taken off. The flat truck bed is ideal for all-around truck service. When they're ready to deliver concrete again, the Rex Moto-Mixer is as speedily clamped back in place—the truck goes out as a Moto-Mixer. The setup provides efficient working schedules that mean lower operating costs—greater profit per ton-mile of service.

They can do this because of the Rex Separate Engine Drive—introduced and developed by Rex Engineers. It gives greater adaptability for interchangeable truck service—makes Rex Moto-Mixers the best on the market for service in small as well as large ready-mixed concrete plants. It's another reason why it pays to forget the old stuff in favor of Rex Moto-Mixers and Agitators.

Send for This Book!

If you are a building supply dealer you need this book. "Rex Moto-Mixers and Agitators" will show you, as it has many others, how to get greater profits from mixing, placing and carrying concrete. See the representative or write for your copy.

Main office address:
1649 W. Bruce St., Milwaukee, Wis.

REX

THE UP-TO-DATE METHOD OF HANDLING CONCRETE

MOTO-MIXERS

CHAIN BELT COMPANY of Milwaukee

VIBRATION *can't loosen this Self-Locking Nut!*

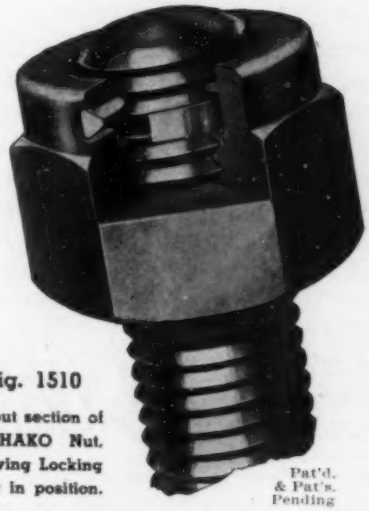
UNSHAKO

The Nut That Can't Shake Loose

● **Incessant vibration soon shakes loose the ordinary nut—but not the UNSHAKO! The unique, live gripping features of this NEW development hold the nut tight despite the severest jarring. *Yet, it backs off easily with the aid of an ordinary wrench* . . . can be re-used as often as desired.**

Furthermore, it is entirely self-contained —has no wandering separate pins or washers. Just an integral, self-locking ring or floating thread—that works on the brake band principle—clinches it tight at the exact degree of adjustment desired.

If *your* problem is permanency in tightness of construction, the solution is here. *Get the details today; use* the coupon, NOW, while you think of it. There's no obligation, of course.



Pat'd. & Pat's. Pending

Fig. 1510

Cutout section of UNSHAKO Nut, showing Locking Ring in position.

THE SELF-CONTAINED, SELF-LOCKING NUT

STANDARD PRESSED STEEL CO.

BRANCHES BOSTON DETROIT INDIANAPOLIS — JENKINTOWN, PENNA. Box 563 — BRANCHES CHICAGO ST. LOUIS SAN FRANCISCO

For Complete Details Mail This Coupon →

STANDARD PRESSED STEEL COMPANY
Box 563, Jenkintown, Pa.

Gentlemen:

Send me details and prices of the UNSHAKO Self-Locking Nut.

NAME .....

TITLE .....

COMPANY .....

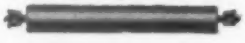
ADDRESS .....

aggregates F-O-B scow

Robins Belt Trainers substituted for every fifth or sixth regular carrying and return idler train belts to run straight.

ROBINS TROUGHING TRAINER

Does not wobble nor cause the belt to weave. The trainer assumes a stable position which keeps the belt in line.



ROBINS RETURN TRAINER

When the weight of the belt falls more on one side, the heavy side rocks downward and forward, skewing the roller, thus holding the belt in a central position.

Robins Trainers are not guide pulleys so do not wear the edges of belts. They are as named. BELT TRAINERS.

ROBINS MAKES

Belt Conveyors, Idlers, Belts, Bucket Elevators, Gyrex, Vibrex and Eliptex Screens, Screen Cloth, Feeders, Bin Gates, Mead-Morrison Hoists, Grab Buckets and all their accessories.

Many a producer spends every effort to keep costs at a minimum in the plant and then wastes a goodly portion of these savings in poor handling from plant to point of loading. A dollar saved in handling is just as valuable as one saved in producing. The above illustration shows material handled efficiently right to the point of shipment. The two Robins Conveyors receive from the washing and sizing plant on shore and deliver directly into the scows at the rate of 500 tons per hour, each. They are most efficient in operation and their high capacity saves demurrage. Inquire what a special-purpose Robins Conveyor will do for you.

MATERIAL HANDLING
ROBINS
EQUIPMENT

ROBINS CONVEYING BELT COMPANY
15 Park Row, New York, N. Y.

Please send bulletins describing.....

Please have representative call at.....

Name .....

Firm .....

Address .....

City..... State.....

Rock Products

Vol. 40 | Chicago, June, 1937 | No. 6

Tough to Explain

Comments by
. The Editor .

Should Congress adopt a resolution, or "pass a law," at the instigation of the good-intentioned Administration, amending or repealing the law of gravity, to the effect that, "henceforth, herewith and hereafter, all objects falling on our beloved citizens, unfortunate enough to be under them, shall bounce off the beans of the said unfortunates, without injury to the aforesaid beans, or their owners, heirs and assigns"—if Congress should pass such an act as this—every one would laugh because its absurdity would be self-evident. Almost every one is aware of the law of gravity.

Whither Bound?

There are other laws of nature just as inflexible although not so readily recognized nor so generally well known. One of these is the law of retribution, or, as Roger Babson calls it, the law of action and reaction; we recognize it in physics and mechanics readily enough, but not always in the moral and economic fields, where the Good Book defines it succinctly thus: "Whatsoever a man soweth, that shall he also reap". A great many people in all periods of history have sought repeal of, or exemption from, that law, but never with anything but very temporary success.

Repealing such laws of nature has been the favorite indoor sport of Congress for the last four years. Administration instigators of such acts are amazingly frank about it. For example, Charles F. Hosford, Jr., chairman, Federal Bituminous Coal Commission, sent an address to the recent American Wholesale Coal Association convention in which he described the new Guffey (pronounced Goofey) coal control act as giving coal operators "what experience tells us they must have—protection against the consequences of their own folly." Oh, how frequently has experience taught us all that need! But experience also has taught us that even an 18th amendment to the Constitution did not prevent a great many of us from having headaches. How, therefore, can a mere act of Congress accomplish it?

The coal operators have merely attempted to shift the consequences of their own folly. They hope an act of Congress can make them good and honest and successful business men, with an accent on the last adjective. They have already discovered that just one act of Congress won't do, there must be other acts of Congress to control the prices of competitive fuels and other sources of power. Soberly analyzed, what they seek is not removal of their own handicap, but the handicapping of all their competitors. And that, unfortunately, is the philosophy behind much of our so-called reform legislation.

Again, the coal operators furnish a remarkably frank example: John D. Battle, executive secretary of the National Wholesale Coal Association, told his members: "The true cost of coal to the consumer is not the cost per ton, but the cost per unit of heat and power. Increased efficiency in the use of coal has resulted in a big reduction in the true cost of fuel." He then argued that the producer of coal should be the one to profit by the increase of the consumers' efficiency in its use! Could anything be more cockeyed in the realm of economics?

● ● ●

Producers and manufacturers—employers in general—have a new kind of competition to meet. They have got to compete with labor agitators and politicians in selling their employes on the best management for industry. The problem of the employes is to find the answer to: Shall the policies of management be formulated and exercised by men trained in business management, or by politicians and bureaucrats whose experience and abilities to cope with business problems is as small as their knowledge of theoretical economics and political science may be great?

One-Sided

In this competition for the understanding, appreciation and goodwill of their employes, business men are handicapped by the Wagner labor relations act which declares it an unfair labor practice for an employer "to interfere with" the right of employes to self-organization, or to "encourage or discourage membership in any labor organization"—or at least so the act is contended by labor leaders to mean. In other words, the employer would be

denied the right of free speech to express his views of any labor union, or of labor unions in general. There are no restrictions on labor leaders in expressing their views about management.

It isn't likely that the most ardent New Dealer would attempt to interpret the Wagner act as limiting the right of free speech, even by employers; nevertheless, it is a good sight for sore eyes to see Henry Ford immediately challenge such a construction of the law. His blast, in the form of a little booklet "Ford Gives Viewpoints on Labor," distributed to his own employes and to the newspapers, contains such "Fordisms" as these:

"A Monopoly of JOBS in this country is just as bad as a monopoly of BREAD!"

"This group (the union organizers) is asking us to sit still while it SELLS our men the jobs THAT HAVE ALWAYS BEEN FREE."

"What was the result of these strikes—merely that numbers of men put their neck into an IRON COLLAR. I'm only TRYING to SHOW WHO OWNS THE COLLAR."

"Figure it out for yourself. If you go into a union they have GOT YOU—but what have YOU got?"

"I have always made a better bargain for our men than an outsider COULD. We have never had to bargain against our men and we don't expect to begin now."

This is strongly reminiscent of Ford's defiance of NRA. At that time the New Dealers were too well aware of Mr. Ford's strength, both among his employes and with public opinion, to wrestle with him. It is doubtful if they do now, for a great many business men who favored the NRA certainly will brook no infringement of their constitutional right to counsel with their employes.

Mr. Ford relies on the innate common sense of the American people. It is hard for him to believe that they will not eventually accept their fate at the hands of men trained to manage industry rather than trust to the management of politicians and bureaucrats, for whose business ability they probably have as little respect as do the managers of industry. Labor leaders, real outstanding ones such as Wm. Green, are just as shrewd and just as good judges of men's abilities as are the managers of industry. They know that federal legislation attempting to cover all the points about which they pick quarrels with management will eventually work as much to their disadvantage as to that of employers.

Mr. Ford, being sole owner of the enterprise whose policies he dictates, has no responsibilities to a board of directors or to stockholders. He doubtless feels keenly his responsibility to his employes as a trustee to do the best he can for them. His personal wants are relatively modest. He has reinvested far more of the profits of his business in enlarging it, and has paid higher wages, than a board of directors would have allowed. Mr. Ford as manager has not been under pressure to adopt a labor policy contrary to his ideas or ideals. Many another manager may have considered an equally liberal policy good business, but his directors have held him back. It may prove, therefore, in the end, not a bad thing for business managers to have ownership pressure offset to a greater degree than it has been by employe pressure. The scales can be more evenly loaded to the managers' advantage if they actually are striving for judicial fairness.

As to the ability of politicians to solve all our industrial problems, we are reminded of a story we recently read in a contemporary, which was about as follows:

An ambitious young man went to a university professor and said: "Sir, I desire a course of training that will fit me to become the superintendent of a great railway system. How much will such a course cost, and how long will it take?"

"Young man," replied the professor, "such a course would cost you $4,000, and require twenty years of your time. But, on the other hand, by spending $300 of your money and three months of your time, you may be elected to Congress. Once there, you will feel yourself competent to direct not one, but all the great railroad systems of our country."

● ● ●

Success To Your Efforts!

An illuminated sign displayed at the recent Milwaukee convention of the American Foundrymen's Association carried some truisms that require constant emphasis: "Coming together is a Beginning; Keeping together is Progress; Working together is Success." Each step is progressively harder than the one that goes before. And it would be much better for industry if the formula were given a much more liberal interpretation—let the various national associations and the industries they stand for work together for the same objectives that the members of any one of them work together for.

At their annual conventions the members of national industrial associations always give much earnest thought to offsetting the activities of other associations representing competitive materials. Never do they discuss the possibilities of coöperating with these other associations to save the common markets of both or all of them. For example, why battle over what kind of cement shall be used for brick mortar, when the bricklayers of New York City and other metropolitan areas are demanding and getting wages of nearly two dollars an hour for six- and seven-hour days? The bricklayers are closing up the markets for all mortar cements as well as for brick. All the industries involved could well afford to get together, keep together and work together to bring the light of reason into the bricklayers' minds.

It would pay these industries well to coöperate in an educational campaign to the public to overcome this strangle-hold on the outlet for their products. There is a shortage of skilled labor in the building trades, momentarily at least—although there will soon be a surplus if new building dries up. The CCC could well be training young men in some of these crafts. It doesn't do so because of politicians' fear of labor unions. Fortunately their fear of labor unions is based merely on their recognition of them as organized opinion. The politicians' fear of organized opinion is just as great if it is aroused in other ways. Pressure groups must be met with other pressure groups. Building material manufacturers have for their purpose a potentially very powerful pressure group—the people who want to build homes and other structures. These people are hesitating because of rising costs of building. These rising costs are largely the result of the strangle-hold of the building trades unions.

· LIME · PROMOTION MANUFACTURE NATIONAL PROBLEMS

ANNUAL CONVENTION OF NATIONAL LIME ASSOCIATION

MANY NEW FACES appeared at the 19th annual convention of the National Lime Association in Chicago, May 11 and 12. Including its predecessor—the National Lime Manufacturers Association—this industrial group has had an existence of about forty years, so that few are left of the pioneers. The program was interesting, instructive and inspiring.

Association Activities

S. WALTER STAUFFER, president and general manager of the association, in a brief address "inventoried" the association, actually and figuratively. "There is a fifth item, which, however questionable may be the wisdom of including it in some corporate statements," he said, "should by no means be omitted from ours, for it is as real and tangible as anything the industry possesses. I refer to Good Will, that feeling of respect and confidence of the public for the industry, built up by sound, honest research and promotion over a period of years; that spirit of coöperation among manufacturers which makes possible our meeting together today and many other days to consider our common problems. *Is this item* fanciful or real? Can you imagine a first year's operation of this Association which would produce, as did last year, over 5,000 inquiries, or approximately seventeen per day, for literature and information concerning your products? Can you visualize a first meeting of lime manufacturers, which would accomplish anything in the way of solving your problems without having first built up that confidence in each other so necessary to coöperative effort? Our industry has a real asset in this item and a part of your dues is properly chargeable to preserving this asset."

President Stauffer then went into detail to prove that the activities of the association have definitely added to the markets for lime, or have held markets that might otherwise have been lost. In conclusion, he gave a formula which contains the essence for successful coöperation in any industry: "First, assimilate this information and other information already available through the association. Second, use it to the best of our ability in promoting and marketing lime, not necessarily our own, but lime; and Third, assume our fair share of the responsibility for the progress of the industry."

Underwood & Underwood, Washington, D. C.
S. Walter Stauffer, President

Lime Mortars

HOWARD R. STALEY, research assistant, Masonry Materials Laboratory, Massachusetts Institute of Technology, Cambridge, Mass., reported at length on "The Bond Layer as Revealed by the Microscope." Following are some pertinent paragraphs:

"In most cases the requisites for high strength in mortars are not conducive to intimacy of contact, nor to the extent and permanence of bond necessary for water-tight walls. The highest strength mortars, generally, are harsh-working and do not possess the plasticity necessary for full and complete contact. Such a mortar, usually of a high cement content, makes it impossible to secure a water-tight wall.

"A statement has been made by an advocate of high-cement mortars that workmanship is 95 percent of the job. It is agrecd that workmanship is of high importance, but workmanship and the water-tightness of a masonry-wall depend 95 percent on the type of mortar used. This latter statement is not a result of laboratory work in an educational institution, but is the result of laboratory work in the school of "hard-knocks", where practical experience is a prerequisite in the curriculum. Mortar must have plasticity and workability, to enable a workman to do a good job.

* * * * *

"The factor, differential volume change, must be taken into consideration during the early setting period. The mortar is shrinking, due to loss of water, and the brick is swelling, due to a gain in water. If the mortar can remain in a "plastic" state during this period, it will be less harmed than one which assumes early rigidity.

"The volume changes which occur after the mortar has set are the most harmful to bond, especially in the high-cement mortars. Several specimens of high-cement mortars, from widely separated districts, exhibit the same traits, namely, high porosity and tentacular contact at the brick line and rupture of the bond, especially towards the weather-exposed face of the joint where volume changes are the greatest.

* * * * *

"Several investigators have stated that water enters between the brick and mortar, but no one has offered any definite proof of the statement. In the thin-sections, made from specimens taken from walls that leak, the state of hydration and carbonation of the matrix surrounding voids at the brick line is much farther advanced and it is quite evident from this fact that leakage has occurred at the interface. In some cases, simply the inspection of the brick-and-mortar specimen with a hand lens gives a good indication as to the place of passage of the water.

"There is one more factor in the assembly of a mortar that deserves consideration; this is the type of sand. Gradation, shape of particles and amount of sand present in a mortar are often the factors that determine the difference between a poor and a good mortar. Sands of poor gradation which exhibit particle interference, tend to make any type of mortar harsh and to increase the porosity. Such sands are more harmful in a high-cement mortar. Over-sanding of high-cement mortars is ruinuous; workability and placeability decrease and the tendency to tentacular contact is increased. Over-sanding of high-lime mortars produces

Henry LaLiberte
Chairman of Board of Directors

the same effects to a less marked degree. Considering the country as a whole, a hard and fast rule of definite proportions cannot be strictly adhered to, as allowances must be made for the type of sand. This latter observation is perhaps obvious, but it is not generally conceded.

"The value of the microscope in this study will perhaps be more apparent from the following discussion and the inspection of the series of photomicrographs following.

"Fig. 1 shows how an excellent high-cement mortar appears on a roughly cut surface. Apparently there is a continuous and intimate contact with the brick surface. Sand gradation seems to be very good and this is an important factor with any kind of mortar. This wall did not leak badly.

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"In Fig. 2 is a section of the same mortar and brick as in Fig. 1. This thin-section shows that there has been considerable water passage through the voids at the brick line. The extent of hydration and carbonation showing in the highly birefringent area over and to the left of the large void at the brick line, is indicative of ample water having been available. Note that the area surrounding the round void, in the upper left, does not show the same birefringence. It is logical to presume that this is a sealed void and no water has been available for accelerated hydration and carbonation.

"Fig. 3 shows a 1C-2L-7S mortar which exhibits good contact in spite of a rough brick surface. The texture of the surface of the mortar appears much rougher than that of Fig. 1, due to the fact that these sections were roughly cut with a carborundum wheel. The cement mortar has the strength to hold the grains of sand to be cut off. In the case of the lime mortar, many of the grains tear out, due to the lower strength of the matrix.

"Fig. 4 is another surface picture of the preceding specimen, taken at the juncture of the old high-lime mortar and the new high-cement pointing which was about $\frac{3}{8}$ in. deep. The old high-lime mortar still retains the same intimate contact, while the high-cement mortar has entirely cracked loose from the brick. This is a striking example of how different these two mortars are in physical properties and action in the wall.

"Fig. 5 was taken from a thin-section of the preceding specimen. Note the intimacy of contact with a very rough brick surface. It is very evident that this mortar had the plasticity necessary to give the intimacy of contact needed for continuity of bond. There are some voids, but there has been only a slight amount of accelerated carbonation. This has occurred in the voids at the brick line, indicating that some water has been available there, but in a very small quantity."

* * * *

Many more illustrations are given in Mr. Staley's paper, illustrating voids in the joint between mortar and brick. His conclusions were:

"(1) Intimacy, continuity and permanence of interfacial bond is necessary for water-tightness of masonry walls.

"(2) Low-lime mortars give a tentacular type of contact and give neither continuous nor permanent bond with the brick.

"(3) High-lime mortars give an intimate, continuous and permanent bond with the brick.

"(4) Water penetrates through brick walls, between the mortar and the brick."

Volume Changes

PROF. WALTER C. VOSS, professor of building construction, Massachusetts Institute of Technology, who is conducting research for the National Lime Association, submitted a progress report "Characteristics of Volume Changes in Mortars," in which he described the results of tests on alternate wetting and drying of mortar specimens. All specimens were stabilized over a period of

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298 days before any of the cycles of wetting and drying were started.

His general conclusions were: *"During the curing and hardening period:*

"(1) Lime hydrate mortars proportioned with equal or greater volumes of lime volume of cement shrink less than cement mortars.

"(2) Lime putty mortars proportioned with one-half or greater volumes of lime per volume of cement shrink less than cement mortars.

"During wetting and drying cycles:

"(1) The lime-putty mortars exhibit the best characteristics from the standpoint of magnitude, and reduction in magnitude, of linear change.

"(2) Linear changes are not directly proportional to weight changes in any period.

"(3) Fine sands increase volume changes with cement mortars, but do

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not aggravate volume changes when high-lime mortars are used."

Lime in Concrete

Prof. Voss has resurrected the advocacy of using lime in concrete in a most interesting way. He said:

"When one analyzes concrete on the basis of bond it becomes more and more evident that the same surface and chemical phenomena are at work in concrete as influence masonry walls. It is probably incontrovertible that strength is imparted to the synthetic mixture of sand and stone by the matrix of cement and water. If one applies all of the conclusions which have been reached in masonry unit and mortar studies to concrete, the conclusion that lime should be added to concrete is inevitable.

"Concrete, however, must be kept up to high strength and care must be used to maintain this strength. Recently those who are really interested in the continued use of concrete but who realize that the great number of failures of concrete due to weathering call for consideration of density and weatherability for a spell rather than the worship of compressive strength, are advocating many processes for accomplishing density.

"The writer is convinced that concrete is nothing more or less than a heterogeneous mixture of irregular masonry units laid by chance in a cement mortar. This prime example of chance masonry workmanship has done many amazing things and everyone admires the continuous study which has been carried on for the purpose of producing better concrete work.

"Let us examine this hypothesis somewhat in detail. The coarse aggregate varies tremendously in internal structure, absorption, shape, unit density, and chemical composition. Likewise the sand in its myriad of gradations and constitution presents the same problem in producing the mortar matrix that is present in masonry construction. Finally the cement-water ratio for the concrete mortar matrix is much higher than for unit masonry work.

"In order not to extend this discussion too much may the writer dare to make a few suggestions for better concrete. Some of these many of you have heard before but in a different way.

"(1) The coarse aggregate should be absorptive. Extremely dense aggregate causes eventual destruction of bond.

"(2) The mortar matrix should be composed of a well-graded sand, and a cement, lime and water matrix which should be proportioned to contain as much lime as will not reduce the strength below a predetermined point.

"(3) Such a combination will provide workability, placeability, will reduce segregation and will be more watertight as time goes on.

"The writer is aware of the condemnation which will descend upon him for these suggestions but believes that careful study and test will eventually justify his stand.

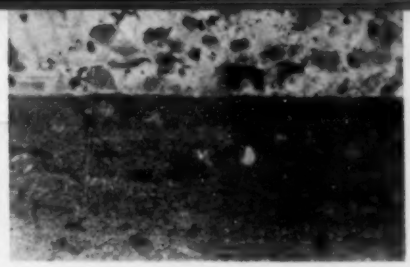
"Let us consider Fig. 6 in the light of these contentions, calling attention to strength and initial linear changes only. Three water cement ratios are here shown. These are based upon the ratio of water to the cement in each mix, the lime being assumed inactive at these early ages. This fact has been proven often before. Two methods of using lime are shown; namely, as added and as replacements, by weight. The lime used varied from 5 lb. to 20 lb. by 5 lb. increments. The strengths are given for the 28-day and a 5 months period. The linear changes are given for the curing period and for the 98 days subsequent to curing, during which the specimens were kept in a room at 80 deg F. and 50% relative humidity. All specimens, indiscriminately increased in length during curing, due to the hydration of the cement. It is evident from these data that an addition of 10 lb. of lime per bag of cement is not detrimental to strength at these periods, and this becomes strikingly evident with the higher water-cement ratios. Twenty pounds of lime is not at all detrimental for the last two water-cement ratios. It can safely be said that the linear change variations are insignificant in any case and certainly cannot be construed in favor of plain cement concrete, the higher water cement ratio showing values in favor of the use of lime, if any. The greatest net differential linear change as between no lime and 20 lb. is only 0.00004 in. per in. which would amount to less than 1-16 in. in 100 ft.

EFFECT OF LIME ADDITIONS & REPLACEMENTS ON CONCRETE

		WATER CEMENT RATIO GALS. PER SACK																		
		6.75						8.20						9.18						
		SPEC. Nos.	COMPR. STR. 28 Da.	COMPR. STR. 5 Mos.	LINEAR CHANGE Curing 1-28	LINEAR CHANGE 28-126	LINEAR CHANGE 1-126	SPEC. Nos	COMPR. STR. 28 Da.	COMPR. STR. 5 Mos.	LINEAR CHANGE Curing 1-28	LINEAR CHANGE 28-126	LINEAR CHANGE 1-126	SPEC. Nos	COMPR. STR. 28 Da.	COMPR. STR. 5 Mos.	LINEAR CHANGE Curing 1-28	LINEAR CHANGE 28-126	LINEAR CHANGE 1-126
LIME ADDITIONS	0	100	2930	3850	+.007	-.059	-.052	200	2490	2100*	+.006	-.063	-.057	300	1670	2625	+.009	-.069	-.060
	5							205	2740	3310	+.007	-.065	-.058						
	10	110	2800	3820	+.008	-.065	-.057	210	2730	3400	+.010	-.069	-.059	310	1930	2770	+.008	-.073	-.065
	15							215	2810	2390	+.011	-.069	-.061						
	20	120	2490	3300	+.012	-.065	-.056	220	2180	3840	+.013	-.069	-.056	320	1510	2695	+.015	-.075	-.060
LIME REPLACEMENTS BY WT.	0	100	2930	3850	+.007	-.059	-.052	200	2490	2100*	+.006	-.063	-.057	300	1670	2525	+.009	-.069	-.060
	10							205	2510	3460	+.013	-.065	-.052						
	10	410	2560	3190	+.008	-.061	-.053	510	2340	3310	+.009	-.063	-.060	610	2430	3090	+.009	-.071	-.062
	15							515	2490	3526	+.011	-.067	-.056						
	20	420	1370	2870	+.003	-.060	-.055	520	3160	3230	+.006	-.065	-.059	620	1880	2560	+.003	-.071	-.065

Comp. Str. 3"ϕ x 6" Cyls. Linear Change % of 10" Length
* Omitted from data + = increase
− = decrease

Fig. 6—Professor Voss' research favors use of lime in concrete



Photomicrographs shown by Howard R. Staley to illustrate bonding:

Fig. 1, above—Roughly cut surface of an excellent high-cement mortar, having intimate contact with brick surface

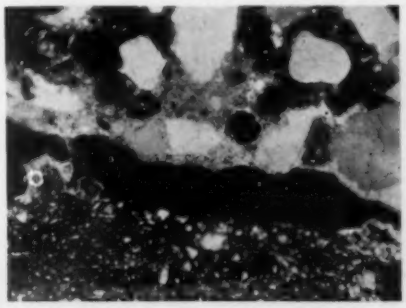


Fig. 2—Same mortar as in Fig. 1. Water has passed through the voids at the brick line (Enlarged 3 X Fig. 1)

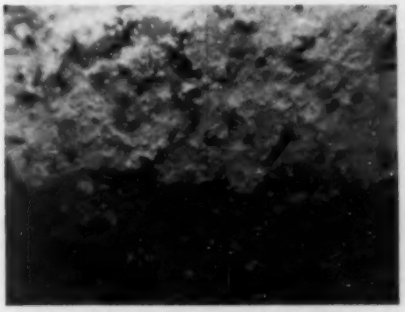


Fig. 3—A IC-2L-7S mortar which exhibits good contact in spite of a rough brick surface

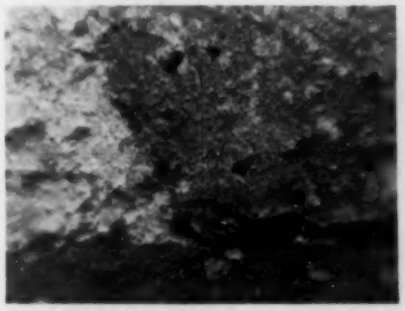
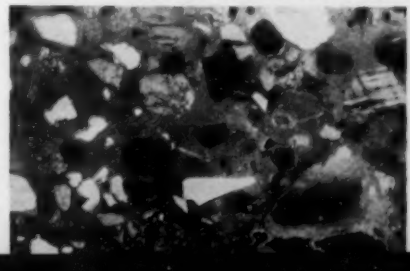


Fig. 4—Same specimen as in Fig. 3, enlarged 3 X as much. Old high-lime mortar retains good contact while high-cement mortar has cracked loose

Below, Fig. 5—Thin section shows intimacy of contact with a rough brick surface



Victor J. Azbe waits his turn, while sympathetic friends (and clients) J. H. Robinson (Gypsum, Lime & Alabastine, Ltd., Canada) and Philip L. Corson (G. & W. H. Corson, Inc.) look on

George B. Wood, past president, presides, introducing Mr. Azbe, in most complimentary terms, while W. V. Brumbaugh, secretary, checks up on the program and the speakers to follow

"The lime in these experiments was added by working lime putty (high calcium) into the mixing water. This method, at present is somewhat doubtful from the point of view of the contractor, but it will not be impossible to find a way to make it practicable. In the meanwhile we will have to use lime hydrate, and this will greatly improve our concrete. The writer may have much more to say about this problem in the near future. The addition of one bag of lime hydrate for each yard of concrete will be a very desirable move."

Lime Manufacture

VICTOR J. AZBE, consulting engineer, St. Louis, Mo., discussed "Recent Developments in Design and Operation of Lime Kilns," so exhaustively that there is not room here to touch on more than the high spots. Further details will be developed in subsequent issues in separate articles. Following are some of the high lights:

"The lime industry, previously somewhat slow in its technical progress, made during the past few years several very important advances. Indications now are that this progress will gather momentum and that in not so many years hence the old and now obsolete plant will disappear. Some of them already have either been changed or completely abandoned and the keen competition will force all along either one or the other of these two alternatives. Quality of lime, labor efficiency, fuel efficiency, reliability of equipment, performance flexibility, and low cost of plant per unit of output will be ever more important factors.

"A kiln of the future will have to be able to put out two to four times the amount of lime the old kilns were capable of and with no more labor. Fuel ratio will have to be twice as great. With all this, life of linings will have to exceed a year. The lime drawn will have to be at option either hard or soft burned, and even when soft burned, of high CaO content. The conversion of plants to more efficient type will have to be accomplished at low cost so the efficiency will show up as economy in actually lowering the cost of lime, and not only in fancy performance."

Mr. Azbe's paper is divided into six parts: (1) Lime kiln heat balance; (2) coolers; (3) dissociation zone; (4) some performances and contrasts; (5) draft; (6) rotary kilns. These contain too much meat to be absorbed in one sitting so they will be treated in subsequent issues. The first part will be found elsewhere in this issue in the "Lime Forum."

Modern Canadian Plant

D. C. HENDERSON, of the Winnipeg Supply and Fuel Co., Winnipeg, Man., described "Lime Burning in a Modern Canadian Plant" in part as follows (after paying a tribute to Victor J. Azbe, who is his consulting engineer and adviser):

"We quarry a limestone of 97% calcium carbonate content. Our stone is broken by hand to as uniform a size as possible with the maximum dimension of 5 in. We use 1-yd. spring type, side-dump cars equipped with our own make of bumper. The spring and the bumper add tremendously to the life of the cars, and our repair bills are negligible. The 1-yd. car makes for easier hand loading and less segregation in the kiln.

"We generate our electric power with Diesel engines, having two units, one double the size of the other, which can be operated separately or in parallel. This arrangement gives us three economical units which satisfactorily take care of all power requirements.

"Our kilns are 70 ft. high with 11 ft. outside diameter shells. They were not purposely built this size. We originally had four Keystone kilns which have been changed beyond recognition.

"We operate with producer gas made with an R. D. Wood automatic gas producer.

"We also use wood to some extent. The supply is not sufficiently great to allow us to entirely operate on wood, although we have proven it to be in our case the most economical fuel. Our kilns can operate on either wood or producer gas and be switched from one fuel to the other in a few minutes.

"It was the high cost of fuel that forced us to seek, in 1929, more efficient and economical operation. We are located more than 1200 miles from the nearest satisfactory coal supply. We had formerly operated with wood as fuel, but in 1929 wood costs were high and fuel ratio terrible. Even with wood our fuel costs were $2.25 to $2.75 per ton of lime. We, therefore, upon investigation decided to remodel our plant to use $9.50 per ton coal in a producer. Our first attempts at operating the gas-fired plant were indeed feeble, but eight years of consistent effort have given us a 4.85 to 1 fuel ratio on producer gas operation, 3 tons of lime to 1 cord of wood when wood firing, 30 tons of lime per day from an inside kiln section of 5 ft. 5 in. x 8 ft. 0 in. A minimum of labor, unbelievable kiln lining life with medium grade brick, no poking of kilns, cold lime ready for shipment, and above all restful sleep for the superintendent.

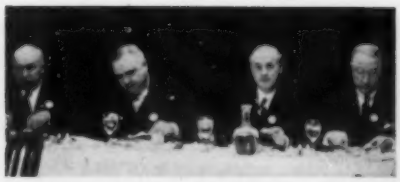
"In attaining these results we have helped to change the course in lime kiln construction and have simplified construction and operation.

"Before coming to details let me say that we have made a great many of trial by error experiments. We have been continually spending money on logical improvements that we have had to scrap. You see we used to figure that we had about six factors of control from our gas producer to our exhaust fan and that a proper balance of all factors must be maintained at all times. We had enough draft gauges and thermometers to run a battleship, but our operation was all over the place. We found our weak spots and to fix them we added more items to control. This proved too much for the men. They could not keep so many controls balanced. Results were disappointing. Our directors were complaining about spending money. After this disappointment we made rapid progress and the answer was 'simplification.'

Remarkably Economical

"In our plant today one man per shift operates gas producer and all kilns. He has instruments to guide him at every stage always before his eyes. His work is largely observation. The producer is blown with a 4% mixture of CO_2 gas. The CO_2 gas is drawn from the top of the kiln by a small blower, and air is added at the blower and the mixture sent direct to the producer. The attendant checks his mixture by analyzing the gases from time to time with the standard Orsat apparatus. This has proven far more satisfactory and economical than steam for producer operation. Our business is not large and usually two kilns only are on the line. This requires as low as 10 tons of coal per day. We have operated the producer economically on as low as 6 tons per day, when running one kiln though this is one-half the minimum recommended by the manufacturers. You know nothing is impossible any more even in a lime plant. Just the other day we stopped the producer at 9 a. m., emptied it, installed a new hood, did a welding job, cleaned out all under pipes and water seals and had the producer back on the kilns in 11 hours, while they were still hot enough to ignite the gas. I hope that's not bragging but we were mighty proud.

John C. Best, G. H. Le Fevre, Best Bros. Keene's Cement Co.; Lee S. Trainor, National Lime Association



James H. McNamara, George J. Nicholson, Bernard L. McNulty and the guest speaker, John Yocum Beaty, at luncheon table

G. H. Le Fevre, Lee S. Trainor, H. N. Huntzicker, U. S. Gypsum Co.

J. A. F. Wendt, lime department, U. S. Gypsum Co.

"The gas is kept at a constant pressure and is delivered to each kiln through one only port. Each kiln has one only gas valve, and when the kiln is in operation that valve is open full. Each kiln has a hollow center arch as described by Mr. Azbe, with small 4 in. x 4 in. outlets, eight in number, giving only 128 sq. in. of gas inlet. Compare this with the old orthodox archway of 2 ft. sq. and usually four of them per kiln. You would be amazed at the gas distribution and penetration that these small outlets give us. Now you have the answer to our small rock. It was found by experiment that with such excellent gas penetration small rock was feasible and advisable.

"The operator then has only to watch his discharge gas temperature and his draft within the kiln. We have found by use of gas testing with an Orsat apparatus that certain pressures are the best. The operator checks from time to time with the Orsat, and with only the producer and exhaust fan to regulate, finds his work very pleasant. We draw the kilns every hour and do not hang them. Our gas distribution is so uniform, and our walls being the coolest part of the interior, make slipping desirable. The one-hour draw makes this possible. The attendant, therefore, with only the producer to attend to and the kilns to regulate has plenty of time to do all well.

"One man per shift handles the lime draw and loads the kiln run draw direct to railway cars. The lime is drawn cold at all times, air for combustion having been drawn up the cooler. This allows direct sorting and loading. One man per shift can handle the output of two kilns. It can be seen that with all our aids our labor cost of plant operation is very low.

Kiln Details

"The discharge gases are withdrawn from the kilns by an electrically driven fan, located on the operator's floor. The waste gas' outlet is located 15 ft. from the top of the kilns. A submerged take-off pipe is suspended across the diameter of the kiln with holes on the under side. This insures against the pull of the fan causing any channelling of gases. The section of the kiln above this take-off pipe is strictly stone storage space, and the stone passing this pipe is approximately the same temperature at all times. For best operation of kiln it is desirable to hold exhaust gases at a uniformly low temperature.

"The top of the kiln is sealed tight—so tight that a pen knife blade cannot be inserted anywhere around the opening. The door is a flat door, operated on wheels by compressed air. The stone cars are hoisted with an electrically driven hoist, and the dumping done manually. A foot pedal opens the sliding door just before the car is dumped and is closed immediately after each car. The kiln draft is, therefore, disturbed only momentarily. Kiln filling takes place once daily, the inactive stone storage zone making this possible.

"When operating on producer gas it has been pointed out that the operator depends on instruments. This is essential. A man cannot guess to the 100ths of an inch water pressure with any degree of satisfaction. Our minus pressure in the hot zone is usually about – -0.06 in. pressure and quite often 0.01 either way from this will give us a carbon monoxide reading in our discharge gases, or an excess air reading. Temperatures of discharge gases are important, as they indicate proper burning of gases in the proper zone of the kiln.

"Our men use a gas testing Orsat from time to time. They prefer doing this as it gives them more confidence and relieves any doubts in their minds. We know this is an unusual procedure, but we heartily recommend this practice.

Wood Burning

"However, in spite of minimum labor costs, long kiln lining life, high fuel ratio of 4.85 to 1, we have recently found a very simple method of making good lime much cheaper than described. In a mood of experiment we spent $250. to fix one kiln to burn wood. With regard to wood burn experiences Victor J. Azbe, who has visited our plant, has this to say:

" 'The burning of lime with wood is just about as old as anything and ordinarily just about as crude as anything. Wood fired kilns ordinarily produced two tons of lime per cord and if they approached two and one-half they were considered very good indeed. With wood at probably four dollars or more a cord, the cost of fuel per ton was thus entirely too high, and although everyone talked of the high quality of wood burned lime, most kilns were converted to some form of coal firing.

" 'Wood burning as ordinarily practiced had many faulty characteristics, some of them very undesirable. Lime was always drawn hot, which we all know is wrong. For every draw the fire was burned down to enable trimming of the kiln, which also was very harmful as the interruption ordinarily was as long as an hour and at times more. Then when fired up the fuel was rather imperfectly burned and the waste gases almost always contained considerable quantities of carbon monoxide, at times as much as 10%.

" 'With all the above, the wood in itself was a rather inefficient fuel due to its high moisture as well as the moisture developed from the combination of its oxygen and hydrogen, and moisture from the combustion of the free hydrogen. The total of this moisture amounted to some three-quarters of a pound for every pound of wood burned. Not only that heat was used for these processes, but later the large amount of steam passing up the kiln carried a rather large amount of heat out of the zone wherein the lime was made. This fact combined with those mentioned in the previous paragraph resulted that the lime kiln fuel efficiency was only about 25 to 30% with the latter figure unusual.

" 'Wood, most wood anyway, has the peculiarity of burning faster than it can get the air by natural draft. One could say it gassifies very readily due to its very porous state. In view of this one concern tried some years ago to inject air into the kiln furnaces by means of a fan. This helped some. It reduced loss due to incomplete combustion, it improved ratio somewhat, it also increased capacity. But as a whole, conditions were still inefficient and the question was whether the improvement was worth the additional complication brought on by the necessity of operating a fan.

" 'Then after these ten years the Winnipeg Supply & Fuel Co. at its plant at Moosehorn, Manitoba, took a further step which led not only to remarkable improvement in ratio of lime to wood, but resulted to a rather considerable extent in simplification of operation. With spruce as a fuel, a comparatively small kiln of about 40 sq. ft. of shaft area produced 16½ tons of lime per day

J. H. Robinson, Gypsum, Lime & Alabastine, Canada, Ltd.; D. C. Henderson, Winnipeg Supply and Fuel Co.; Philip L. Corson, G. & W. H. Corson, Inc.

Charles Warner signs the register

A. B. Mack, Kelley Island Lime and Transport Co.; John J. McInnis and James H. McNamara, Eagle Rock Lime Co.; Bernard L. McNulty

with only 5½ cords of wood, therefore, at a ratio of 3.0 tons of lime per cord, and this with high calcium lime, and with no power for fans, and even without hanging of kiln to trim.

" 'The wood is fired into two suitable boxes, one at each side of the shaft, each of which is connected through two eyes with the kiln. Wood is piled into these in the ordinary manner, the difference being that amount of air admitted is controlled and limited so that these two boxes are virtually two semi-gas producers.

" 'The cooler is deep and the air for combustion of the wood gas entering kiln comes up through this cooler. The lime drawn is perfectly cool; all of its sensible heat that ordinarily is wasted is here utilized to preheat the air. Through the center of the shaft, at the firing level in between the eyes, there is a pier that retards the lime in the center and so allows the lime at the sides from over the eyes to travel faster. There are poke holes to trim the kiln when the lime hangs, but this hanging is discouraged, the slip principle being employed on most draws, and so the lime is drawn every hour. The lime, being cold, is drawn with wheel-barrows and wheeled directly into the railroad car. It is inspected for core in the wheel-barrows and again when dumped in the car. The same man fires, draws, cores the lime and loads the car, and has plenty of time to spare and no really hard work. It is an operation really beautiful in its simplicity.

" 'Most of the air for combustion comes up through the cooler, which is one of the secrets for obtainment of the very good results. The hot zone is rather hot, as it would be when higher preheated air is used for combustion. The fire boxes, two in number, are deep and roomy and, to all effects, semi-gas producers. As most air comes up through the cooler, only a limited amount is allowed to come in through these semi-gas producers. The gases from the semi-producers, rolling into the kiln, contain a lean producer gas of about 10 or 12% CO_2 and 15 to 18% CO. While this gas, as a gas, is poor due to still too large amount of air passing through the furnaces, there is no harm in this in view of the fact that lime is drawn cold.

" 'In the following tabulation data on capacity and fuel ratio of these kilns is presented. The weight of spruce given is, however, likely to be high and so results may be even better than those given:

Nature of lime	High calcium
Lime per cord of wood	3.0 tons
Weight of a cord	2650 lb.
Heat value per lb. of wood	6660 B.t.u.
Lime per lb. of coal 14,000 B.t.u. basis	4.8 lb.
Thermal overall efficiency	48%
Shaft area	42 sq. ft.
Lime per average day	16½ tons
Lime per sq. ft. shaft area per day	785 lb.
Kiln shell diameter	11 ft.

" 'The efficiency of 48% is really exceptional, particularly on account of the large amount of heat that is unavoidably lost due to the moisture in the wood. There are even plants firing with producer gas using coal that do not obtain such results. Capacity also is exceptional and most 40 sq. ft. shafts produce on natural draft 10 or 12 tons of lime, and that with coal. Here far more is accomplished with wood. Then to get 16½ tons of lime out of an 11-ft. shell on natural draft is also remarkable. Therefore, all in all, this must be considered as a very notable performance and one that should be very useful in regions where wood is the natural fuel.'

Advice to Small Producer

"We believe that our results of 3 to 1 ratio on wood or the equivalent of 4.8 to 1 of coal is far in excess of any results heretofore received. Some of the factors allowing this result are:

(1) Deep fuel bed.
(2) Tight doors.
(3) Small grate area.
(4) High kilns (or good draft).
(5) Leak proof walls.
(6) Restricted top opening.

"If it can be considered by some that we have an up-to-the-minute plant and are securing first class results, and that we might be in a position to give some word of advice to the small producer, may I be excused if I make the following comment to those desirous of increasing efficiency and economy.

"To superintendents: Give to others most of your routine and every day duties; attempt first to make the best use of what you have to start with, seek information and advice from those who are equipped with wide experience, don't let even years of disappointments or failures deter you.

"To owners: I suggest that you encourage your men with the allocations necessary for conducting experimental changes. If you stick with them it will pay you greatly. Results don't come over night; there are too many factors against that. Realize that the truths of lime manufacturing are yet little known by many of us, and opinions and practices are not yet standardized."

Discussion

Questions and answers developed that the kilns were insulated with a mixture of Zonolite (heat-expanded vermiculite) and a refractory cement.

Rotary Kilns

THERON C. TAYLER, vice-president, Belle Isle Lime Co., Detroit, Mich., read a brief paper on "Value of Vertical Stone Preheaters on Rotary Kilns," in which he said:

"This paper is somewhat premature. As an engineer I like to talk about proven facts. The few months of actual operation of our preheater have been

Prof. Walter C. Voss, Massachusetts Institute of Technology, discusses a weighty matter with Irving Warner, Warner Co.

The Lime Industry maintains its record of at least one lady member—Mrs. M. K. Lounsbury, Allwood Lime Co.; James H. McNamara

S. Walter Stauffer, president and general manager, National Lime Association, with Charles Warner, past-president of both the original National Lime Manufacturers' Association of forty years ago, and its successor

insufficient to prove my theories regarding the value of preheaters for rotary lime kilns, but the evidence obtained to date all supports it.

"Preheaters for lime kilns are not new. They are a part of every shaft kiln. The feed end of every rotary kiln is a preheater; but like the entire rotary kiln it is thermally inefficient.

During the past decade preheaters separate from the rotary kiln have been added to many cement plants. The problems involved in preheating cement slurry are much more complex than for preheating crushed limestone, due to the difficulty involved in passing gases through the bed of raw materials, which in normal condition lacks voids or open spaces between the particles. Any one interested in this subject should study article published in ROCK PRODUCTS, March, 1932, on "New Cement Burning Process" as installed at San Sebastian, Spain.

The general principle is not new to the rotary lime kiln plant. I had hoped to submit a print showing an installation as made many years ago at the Wyandotte, Mich., plant of the Michigan Alkali Co., but it has not reached me yet.

It is easy to see that we do not need the very complex and expensive preheating equipment of the cement plant, and it is not difficult now to prove that the general proportions of the plant erected by Michigan Alkali Co., would destine it to be a failure.

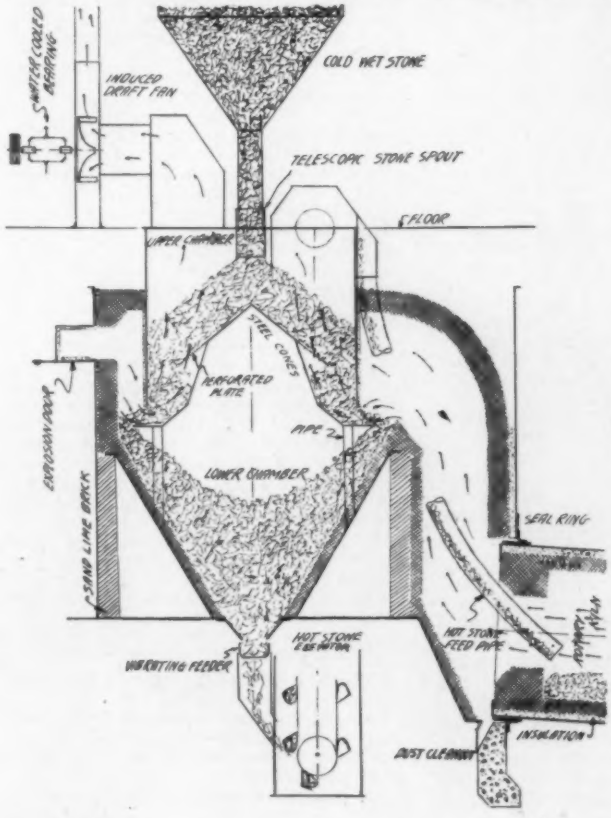
"From the thermal standpoint we know that the ordinary rotary lime kiln utilizes the heat of the gases from about 2500 deg. F. down to about 1250 deg. F.—about half of the heat of the gases goes up the stack. To bring the stack loss down we might add 200 ft. to the length of the rotary kiln, but we might add almost as much in radiation loss through the shell, as we would recover from the stack gases. It is doubtful if the increase in efficiency would be sufficient to justify the increased installation cost or extra space required.

Norman G. Hough, former president and general manager, National Lime Association, in a happy mood

"The rotary kiln is a poor form of heat exchanger—the hot gases rise to the top and the cold stone hugs the bottom. It is effective only as a means of getting large capacity with small stone and uniform degree of burning. It makes a suitable combustion chamber for a long flame and is suitable only for the high temperature end of the burning operation. For efficient heat exchange the gases should pass through the bed of stone, not just over it.

"Anyone interested in kiln efficiency should study an article by Victor J. Azbe, published in the 1926 proceedings of the N. L. A., and entitled 'Heat Distribution in Lime Kilns and Evolution of Ultimos.'

The plant of the Belle Isle Lime Co., represents my attempt to make a rotary kiln installation approximate his ideal shaft kiln. As a first attempt—lacking much basic data—I feel that we made a big step toward his proposed goal. Our gases leave the rotary kiln and enter preheater at 1300 to 1500 deg. F. They leave the preheater at 300 to 600 deg., depending largely on the percent of excess air. Stone enters the preheater cold, wet and sometimes frozen and leaves at temperature close to 1300 to 1500 deg. Radiation losses from the preheater are comparatively negligible.



Details of the preheater ahead of the rotary lime kiln at the Belle Isle Lime Co. plant

Capacity

"The preheater not only adds to the efficiency of the kiln by recovering heat from stack gases but adds to kiln capacity by making almost the entire length of a rotary kiln a calcining zone. Our 6 ft. x 100 ft. rotary was rated at 40 tons per day. It has been operating at a 50-ton rate, and I firmly believe that it will go over 80 tons per day as soon as stone size and fuel feed problems are disposed of. Since we designed for a rate of 100 tons per day, it is expected that the proposed increase will actually increase the thermal efficiency.

Heat Balance

"A rough heat balance at present would probably look like this:

	B.t.u.
8000 lb. stone per hour heated to 1400 deg. needs 8000 × 0.22 (sp.ht.) × 1400 deg...	2,464,000
Evaporating 2½% water and converting to steam at 400 deg. takes 0.025 × 8000 × 1250 B.t.u. per lb.....	250,000
Total heat to stone.....	2,714,000
Heat from gases (assuming 11 lb. air per lb. fuel) [800 lb. fuel × 12 lb.) + (8000 lb. stone × 44% CO_2)] ×0.24 (sp.ht.) × (1400 deg. —400 deg.)	3,148,800
Difference, loss by radiation, etc.	434,800

Design

"Our preheater as indicated in diagrammatic sketch consists of an upper round chamber or magazine like the old fashioned "base burner" stove and a lower conical chamber intended for complete temperature equalization. The gas travel is first downward toward and into the lower chamber and then upward into the upper chamber. Gas travel is counter-current to stone travel thereby effecting maximum heat exchange. The gas is drawn through the stone bed by an induced draft fan with water jacketed bearings. The stone moves downward by gravity, its rate of movement is controlled by a feeder at the bottom, which in turn is controlled by a rheostat from the firing floor. The depth of stone in the preheater is adjustable by use of a telescopic spout from the stone storage bin above the preheater. When the hot stone leaves the preheater it goes through a vibrating feeder to a bucket elevator so that it can be spouted into rotary kiln.

Practical Considerations

"A preheater sounds good theoretically but the practical considerations perhaps outweigh the former. Space and first cost are comparatively small for the results obtained. Efficiency is high and capacity is large.

"Experience has taught us the necessity for some safety precautions. If powdered fuel is used there are times when an excess will pass unburned through the kiln. There must be no ledges or places where it can accumulate.

"Gas may, under some conditions, accumulate in a preheater, and if given air becomes an explosive mixture—hence the necessity for a kiln seal ring and other precautions against air leaks. Explosion doors add to the safety.

"There must be ample free area through stone bed because an excessive draft pressure means excessive power consumption. This is a matter requiring much detailed study and experimental data which have been utterly lacking.

"Construction materials must be found suitable for temperatures obtained or provisions made to limit temperatures. Provisions must be made for expansion and contraction.

"For some protection to ourselves a patent has been applied for to cover some basic principles and design."

Discussion

It was brought out in the discussion that this kiln is insulated throughout its length with a mixture of Zonolite and portland cement with a little clay. The insulation is 3 in. thick.

Control Testing

H. N. HUNTZICKER, research department, U. S. Gypsum Co., Chicago, Ill., read a paper of extraordinary interest and value on "Control Testing and Consumer Satisfaction," which follows::

"The attitude of the lime industry regarding the question of whether or not we should employ lime tests lies somewhere between the opinion that a lime test is a necessary evil and the thought that it is impossible to employ too many tests. It is impossible to defend either of these positions, but both of them are indicative of the cognizance we give consumer demands, which after all, have been the means of prodding us into greater testing programs.

"In establishing a testing program we should strike a mean between these two extremes, and rather than depend on a very large number of tests, put the emphasis on the proper selection of tests, so that test results will actually represent results that the consumer can reproduce in his use of the lime. It seems quite apparent that if both the manufacturer and the customer have in common a reliable method or yardstick for evaluating a lime, we then have an ideal set-up for merchandising lime on its merits, and we have in addition, a definite mark from which to start in experimental work designed to improve the lime itself and subsequently the process in which it is used.

"With this premise in mind, that control testing is a means of shaping lime production to meet the specific needs of the consumer, let us see how adequately we are equipped to do this, how much testing is actually necessary, what is being done to overcome present deficiencies in present testing methods, and lastly, what is the consumer interest in these matters.

"For the purposes of this discussion, it seems desirable to divide the further remarks into two sections, one applying to building limes, and the second applying to chemical limes.

I. Building Limes

"One of the things that will be emphasized throughout this paper is the desirability of having control tests come as closely as possible to being small scale duplications of consumer practice. For this reason, and obviously, the best way to determine how a finish coat will apply, and what the workman will find, is to make trial applications on test panels that are preferably not smaller than 8 ft. x 8 ft. Similarly, the working qualities and sand-carrying capacity of a lime for masonry mortar can best be determined by putting up test mixes and trowelling the material on test masonry units.

"We have found in our laboratories that these application tests are by far the most reliable for determining the trowelling characteristics of a material, that is, next to actual job trials. It is admitted that application tests on this scale are too strenuous for daily use by a mill control laboratory, but, nevertheless, we are convinced that they should be employed periodically, and at intervals certainly not farther apart than every two or three weeks. This serves to keep a testing staff better aware of the real end of control testing, and gives these men something to which they can tie their other test results.

"Assuming that we use the panel test as the directing power in our control testing, what, then, are the other tests of a faster nature that we can use, and what properties do we wish to find in order that we can assure ourselves that the consumer will have the most satisfactory experience with our product?

"The properties we try to develop in a building lime are mainly plasticity, workability, and extensibility. And, in addition, we have to give careful consideration to the soaking qualities of hydrates and the slaking qualities of quicklimes. A mill control testing program should include daily tests of 16 to 24-hour soaking consistencies of hydrated limes, such tests as closely as possible simulating job conditions.

"These same test samples may be used to check body and slump of the gelled putty. Changes in the quality of the quicklime or the operation of the hydrator, may be followed in this manner. Quicklime products should be checked daily by slaking, and in these tests, the slaking consistency should be recorded. Screen tests on quicklime putties are valuable for determining the amount and nature of the residues.

Soundness

"The matter of soundness has been given sufficient publicity of late to warrant some discussion. It has been our experience that the best mill control test we can use is the present tentative A.S.T.M. autoclave test, or something very similar to it. Admitting that accelerated tests are never as accurate as service tests, the autoclave test is very useful in control work with either high-calcium or dolomitic limes. Too much emphasis should not be placed on one 4-in. x 4-in. test plate, however, and since it requires but little more time to put up and steam four or six plates, a multiple plate test is recommended. Soundness tests should be made most often on finishing quicklimes and finishing hydrates, although in the case of the latter, many of them are fine enough to require a minimum of attention outside of a close control of the top particle size. Materials that cause popping are not as dangerous in masons' quicklimes and hydrates in amounts in which they ordinarily occur, but the autoclave test is nevertheless valuable as a control test to determine whether or not the production is running within safe limits. Generally speaking, quicklimes should be tested more often and with more care than hydrates. Obviously, the author is not of the opinion that the same soundness requirements should be put on both masons' and finishing limes, although many of our widely used specifications do this very thing.

Mill Tests

"In originally working up this paper some attempt was made to list sets of mill control tests for hydrated lime and for quicklime. Difficulties were encountered immediately. Dolomite products have certain characteristics that require different tests than do high calcium products. Different quarries and different plants offer special problems and serve different markets. Each plant, in other words, has at least a few very valuable control tests that are specific to that plant. After eliminating these, and without elaborating further, all control testing programs should have in common (1) application tests; (2) soaking tests; (3) slaking tests; (4) some standardized system of putty examination for use on putties obtained in the soaking and slaking experiments; which should include (*a*) plasticity, (blotter); (*b*) soundness; (*c*) body slump and gelling characteristics; (*d*) working qualities; (5) screen tests; (6) water capacity; and (7) sand capacity.

"If mill laboratories have access to a well-equipped research and testing laboratory, it is desirable to have this mill control work supplemented by Emley Plasticity tests, photometer values, fineness modulus determinations, staining tests, etc.

"Too much emphasis cannot be placed on mill control test records. No lime plant is without some few complaints from one source or another, and the mill records of tests on shipments are the starting point in running down the cause of the complaint. It is highly desirable that the mill quality man, in close contact with mill tests, gets an opportunity to use his accumulated test data by being put on job complaints periodically. He needs this contact with the customer, or man using the lime, to appreciate the value of his tests, and perhaps, to see where new tests are needed or old ones modified to best make his control testing a means of obtaining consumer satisfaction.

II. Chemical Lime

"The problems confronted in the merchandising of chemical or industrial lime products are considerably different than those presented by building limes, and consequently, control tests must be quite different.

"A purchasing agent buying lime for

a chemical process is chiefly interested in availability, or in other words, he is interested in the lime that will give him the greatest yield per ton of lime used in his particular process. Obviously the best test he can give a prospective lime is a trial run in his plant. Here is the lime producer's key to the selection of the control test he should use to best shape the production of his lime to meet the needs of the consumer. The best test will obviously be one that duplicates, or comes very close to duplicating, the consumer's process.

"No originality is claimed for the idea that a test for availability should be based on the particular process in which the lime is used. Haslam, Adams and Kean[1], Blair[2], Armsby[3], and others have made some interesting contributions along this line.

"It is interesting to see what help we get from widely used specifications on lime for various chemical uses. Out of seven A. S. T. M. specifications covering the use of lime in five industries, we have four requirements covering minimum gravimetric analyses and three requirements for available lime by the Modified Scaife Method. The only specific references to availability are these three available lime requirements. Yet in the processes covered by the seven specifications we may have not less than 13 different sets of conditions wherein the lime reacts with 13 different compounds or groups of chemically reactive substances. Federal Specifications present the same kind of a picture.

"It is not proposed, in this discussion, to assume that the above specifications setting forth general requirements are anything but valuable assets to the industry. It is only proposed to point out wherein there may be dangers in permitting traditional tests to assume too great general use and importance. Accurate test results are of no moment if the results have no connection with the consuming process, and for this reason, the present purpose is to put some emphasis on the proper selection and evaluation of tests.

"Probably the most commonly used available lime test in the lime industry is the Modified Scaife Test which determines what percentage of the lime will react with hydrochloric acid. It is interesting to examine some results of available lime tests made by this method on chemical quicklimes and hydrates produced by 22 different lime companies representing every high calcium lime producing area in United States.

Is it possible that the differences shown by these test results are indicative of variations in yields that would be obtained if each were used in the same water treatment plant, or, is it possible that these figures represent the relative values of each of these limes for use in liberating ammonia from coke oven wash liquors, for use in causticizing, or for making lime-sulphur solution? We have no results that indicate this. In fact, lime consumers report variations in lime yields far greater than the differences shown by either the available lime or actual calcium oxide contents.

"Because there is a lack of correlation between available lime (Scaife) results and process yields does not mean that it may not have value as a control test. In high calcium plants it has a very definite place in mill control work as a general check on the burning operation, or certain variations in rock purity. Ordinarily the sugar method for available lime is a more desirable control test because it requires less time, but if a customer's specifications are based on some of our standard specifications employing the Scaife test, it is also desirable to use the latter. Some of our specification writers have suggested bonuses for available lime contents above the specified minimum requirements. Although bonuses are very welcome, this situation is unfortunate in two respects, first, because available lime tests made on the same lime in various laboratories often do not check within the limits of a bonus increment, and, second, because there need not be a close correlation between the availability of the lime in the process and the availability of the lime for reaction with hydrochloric acid.

"Table 2 records some available lime results obtained by analysts in three mill control laboratories, two research laboratories, and one consulting laboratory. Each test was made on a portion of the same lime sample already prepared for analysis, and each test was made by having the analysts follow identical sets of directions. Although the variations in results are unusually great, each of these laboratories had no difficulty in obtaining close checks on its own work. This point is emphasized to show that one laboratory control man will readily detect variations in the run of lime he is testing, but the correlation between his results and those obtained in a consumer's laboratory, or a consulting laboratory, may be quite another story.

"The lime industry is rapidly becoming cognizant of the fact that hydrochloric acid availability is not all important. More thought is being given to settling rates, slaking rates, reaction rates, special analyses, color characteristics, and other properties. This is certainly desirable, but herein we run into danger of placing too much emphasis on a single property, or the result of a test that applies to one property. For example, certain chemical quick-limes are highly recommended to lime consumers as fast settling, or slow settling, when it is well known that the settling rate may vary at least 1000% in various processes wherein the lime is slaked by different procedures and under different conditions. Comparative settling rate determinations are very valuable, but only when they are obtained under conditions that simulate the process.

"Tests that bring out individual properties, such as settling rates, are important in correcting certain deficiencies in a lime product, but often in correcting any one property, the adjustment may make the lime less desirable from other angles. The difficulties that may be met in emphasizing a single property test may be illustrated by the data in Table 3. These data were obtained on eight samples of quicklimes produced in the same territory and sold for water treatment work. If we use any

(1) *Ina. Eng. Chem., 18, 19 (1926)*
(2) *Ind. Eng. Chem., 18, 389 (1926)*
(3) *Chem. Ind. 37, 437 (1935)*

Typical tables developed in control testing

TABLE 1. A COMPARISON OF AVAILABLE LIMES (MODIFIED SCAIFE) AND ACTUAL CALCIUM OXIDE CONTENTS (GRAVIMETRIC ANALYSIS OF REPRESENTATIVE U. S. INDUSTRIAL QUICKLIMES AND HYDRATES.

	Quicklimes				
	Total CaO	Available CaO		Total CaO	Available CaO
(1)	98.45%	95.4%	(19)	96.33%	92.9%
(2)	98.26	96.2	(20)	97.15	94.8
(3)	98.22	85.6	(21)	96.17	92.5
(4)	97.46	93.3	(22)	97.48	89.2
(5)	97.01	96.3	(23)	97.36	86.9
(6)	97.79	94.6	(24)	96.83	94.8
(7)	96.19	94.5	(25)	97.52	92.2
(8)	96.78	89.7	(26)	97.43	93.7
(9)	98.13	94.7	(27)	98.40	94.9
(10)	97.02	92.3	(28)	98.55	94.8
(11)	98.82	97.3	(29)	98.54	93.4
(12)	97.08	95.9	(30)	98.35	93.4
(13)	98.18	97.5	(31)	98.56	93.4
(14)	94.57	91.5	(32)	96.73	94.0
(15)	97.61	96.1	(33)	97.82	96.5
(16)	99.23	95.3	(34)	97.30	90.0
(17)	99.14	97.5	(35)	96.85	94.1
(18)	98.44	96.2			
	Hydrates				
	Total CaO	Available CaO		Total CaO	Available CaO
(1)	73.91%	67.0%	(14)	72.83%	70.9%
(2)	73.94	71.1	(15)	72.39	71.7
(3)	73.10	68.6	(16)	72.96	70.8
(4)	74.47	69.8	(17)	74.63	71.8
(5)	72.58	68.2	(18)	74.94	70.0
(6)	72.25	70.8	(19)	74.90	70.2
(7)	68.07	64.3	(20)	74.69	71.2
(8)	73.30	70.4	(21)	74.86	72.2
(9)	70.73	68.0	(22)	73.89	70.1
(10)	68.32	64.5	(23)	71.28	64.5
(11)	73.25	61.4	(24)	71.84	66.0
(12)	74.50	66.1	(25)	74.61	70.9
(13)	72.78	70.4			

TABLE 2. A COMPARISON OF AVAILABLE $Ca(OH)_2$ RESULTS OBTAINED BY SIX LABORATORIES ON PORTIONS OF THE SAME ORIGINAL LIME HYDRATE SAMPLE.

	Sugar Method	Modified Scaife Method
Mill control laboratories		
A	94.5%	93.9%
B	92.7	91.1
C	94.0	93.9
Consulting laboratory	95.7	94.9
Research laboratories		
A	93.9	92.4
B	93.1	93.9

TABLE 4. TYPICAL DATA SHOWING RESULTS OF TESTS TO DETERMINE THE VALUE OF AN INDUSTRIAL QUICKLIME FOR USE IN CAUSTICIZING.

Settling Time		Phenol-phthalein	Methyl orange	Percent causticity	Lb. lime per 100 lb. soda ash
50 c.c.	2.15 min				
100	4.15				
150	6.25				
200	8.33	19.5 c.c.	20.9 c.c.	86.6	61.0
250	10.66				
300	13.10				
350	20.00				
387	24 hrs.				

TABLE 3. A COMPARISON OF PULVERIZED QUICKLIMES FOR WATER TREATMENT.

Quicklimes in order of desirability for Water Treatment	% CaO by gravimetric analysis (non-vol)	Available lime Mod. Scaife (non-vol)	Dry screen analysis through mesh			Settling Rate. % volume at 1 Hr.	Slaking rate. time for 25 g. of lime to raise temp. of 100 c.c. of water from 25 deg. to 50 deg. C.
			100	200	325		
(1)	98.39	95.4	98.9	92.8	86.2	60	4 min. 10 sec.
(2)	98.55	94.8	100.0	99.4	77.5	70	1 min. 35 sec.
(3)	98.28	96.2	99.9	97.1	91.3	86	3 min. 25 sec.
(4)	96.98	96.3	½ in. and down			75	13 min. 10 sec.
(5)	97.71	94.6	92.8	46.0	32.6	62	4 min. 20 sec.
(6)	97.42	93.30	72.1	54.2	47.6	92	2 min. 45 sec.
(7)	97.50	92.25	69.5	46.0	32.6	87	6 min. 20 sec.
(8)	98.29	85.65	1 in. and down			78	14 min. to max. temp.

one column of results and arrange the eight products according to desirability on the basis of these results, we will obtain a different arrangement than if we selected another column showing another characteristic. The present arrangement finds the best water treatment quicklime at the top, the others being successively less desirable. To determine this order, five gallon batches of Chicago water were treated with the proper amount of each lime to obtain complete reaction, agitated, and settled. Speed of reaction, lime necessary, and settling characteristics were the criteria on which desirability was based. By reacting the lime with water it was possible to correctly evaluate the lime and also evaluate, to some extent, the relative value of each property. Obviously different treatment processes would require variations in test methods.

"To be more explicit, when lime is to be used for water treatment, the best test that can be given is one wherein it reacts with the water that is to be treated. If lime is to be used for making bisulphite liquor, the best test is one wherein the lime reacts with sulphurous acid. Using this type of test it has been possible to duplicate the consumer's results when other tests failed. This type of test might properly be called a process test, and as such it is a recognition of the fact that the use of lime in water treatment, the paper industry, causticizing, or any one of the large number of chemical processes wherein lime is used, is in each case a different problem and the lime to be properly tested should in each case be tested by a specific test applicable to that use.

"Laboratory scale chemical process duplication has the same relation to our other tests as have building lime application panels and test piers to the specific tests for plasticity, soundness, putty yield, etc. The process test is a method of obtaining a mean value representing an evaluation of the lime on the basis of all its properties, each being given its proper factor.

"Some of our most interesting and useful control tests along this line have been developed for dolomitic limes, possibly because the available lime test is not readily adapted to a dolomitic lime and is rarely used. We have not been forced to use a traditional test, and have, as a result, developed tests based on the process reaction and conditions.

"Interesting, but not strange, is the fact that consumers are giving us our best control tests. The consumer who uses lime for causticizing is not interested in how completely a lime will react with hydrochloric acid; he wants to know how it will react with sodium carbonate, and how fast the resulting carbonates will settle. The test data in Table 4 are the results of a test that does these very things. The method of obtaining these data represents the type of control test most applicable for lime to be shipped to the customer who wants a lime for causticizing.

Conclusions

"As was pointed out for building limes, it is impossible to present a uniform set of control tests for each plant because of specific quarry and operating problems in each plant. Dolomitic and high calcium limes offer different problems to the tester because they behave differently, and usually, as classes and often individually serve different processes. The thought to be taken from this discussion, however, includes and goes beyond these individual plant adjustments. *Select control tests that come as closely as possible to being duplications of consumer usage.* In this way a control test is not merely a means of obtaining a uniform output, although this is important. It becomes a means of bringing the lime producer and consumer together in a mutually satisfactory relationship that will ultimately result in the improvement of both the lime producer's and the lime consumer's products. With these ends in mind, it behooves us as lime producers to frequently give our control testing some necessary consideration to determine whether or not it is performing its proper functions."

Lime Markets

J. MORLEY ZANDER, secretary and general manager, Saginaw Brick Co., Saginaw, Mich., secretary of the Sand Lime Brick Association, spoke on "The Use of Lime for Brick and Blocks", describing the sand-lime process and the high quality of the product in general terms. As a market for lime, he said:

"About 350 lb. of hydrated lime are needed to make a thousand standard size brick, or one hundred blocks. On this basis a sand-lime brick factory producing 30,000 brick per day, will use about 5 tons of lime per day, or from 1,000 to 1,200 tons per year. This same factory will require in addition to the lime used, about 50 cu. yd. of sand, 3 tons of coal and 100 electrical horse power, per day.

"In recent years, much masonry work has been done with larger units than brick. A number of sand-lime brick makers have met this trend by making and marketing sand-lime blocks, similar in size and shape to cement blocks, tile, and slabs. With these units a very beautiful wall is built. These walls are smooth and clean in appearance and in many instances no other finish is used on the interior of the building. The popularity, and likewise the production of these units is increasing rapidly.

"The sand-lime brick and block industry has been established 38 years in this country, has risen high during periods of prosperity, and weathered depressions, and today, supported by a multitude of friends, it is a permanent industry."

Insecticides

DR. RAY HUTSON, head of the department of entomology, Michigan State College of Agriculture, East Lansing, Mich., presented a comprehensive paper on "Role of Lime in the Battle Against Plant Diseases and Insects". This paper covers details that would prove very helpful to lime manufacturers in marketing lime; unfortunately space does not permit reprinting here. In conclusion he said:

"Lime and lime-containing insecticides and fungicides have held and maintain a role in plant protection because the two primary considerations of effectiveness and economy are largely satisfied. The most important single unanswered question concerning the role of lime and lime-containing materials and their use against insect and plant diseases is the matter of effect on foliage. This question must be answered, since it becomes increasingly apparent that the matter of foliage injury has been given too little attention.

"Other problems, such as the physical state of lime, its adherence, manner of action against insects, and statistics indicating the trends in the use of lime in fighting insects and plant disease are reviewed and suggestions given."

Selling Process

RUSSELL G. CREVISTON, advertising and sales promotion, Crane Co., Chicago, Ill., with the aid of charts, described the setup of his company for "The Selling Process". His paper was rather involved for the simple sales organization the ordinary rock products producer has to have, but his emphasis on coördination of sales and promotional work and the instruction of salesmen on the products they have to sell could well be applied anywhere.

Labor

WHITING WILLIAMS, counsel on labor relations, author and lecturer, spoke on "What's On the Worker's Mind Today?" In general this followed very closely his talk on the same subject at the annual convention of the National Crushed Stone Association at Cincinnati last January, which was published practically in full in ROCK PRODUCTS, March, 1937, pp. 78-82.

One point he emphasized that every employer today should grasp: The employers are engaged in a *selling contest* between themselves and outside influences. The customers are the employes and the product offered is goodwill and confidence. The primary principle of

successful selling is to know your customers. In this field of selling, Mr. Williams said, employers are green salesmen. They pay too much attention to their competitors (labor agitators) and are too apt to take these competitors' estimate of their own employes. He again emphasized that there are no big class issues in this country, and he expressed opinion that the C.I.O. was primarily a blossom of the depression period and would not last.

Politics

ABRAM F. MEYERS, counsel, Washington, D. C., former chairman of the Federal Trade Commission, discussed "Current Trends in Federal Legislation". A few extracts follow:

"Let us review very briefly the provisions of the National Labor Relations Act. It provides that 'employes shall have the right of self-organization, to bargain collectively through representatives of their own choosing, and to engage in concerted activities for the purpose of collective bargaining or other mutual aid or protection'. It then declares that it shall be an unfair labor practice for an employer (1) to 'interfere with, restrain or coerce employes in the exercise of' the foregoing rights, said to be 'guaranteed' by the Act; (2) to 'dominate or interfere with the formation of any labor organization or to contribute financial or other support to it'; (3) to 'encourage or discourage membership in any labor organization,' 'by discrimination in regard to hire or tenure of employment or any term or condition of employment'; (4) to 'discharge or otherwise discriminate against an employe because he has filed charges or given testimony under' this Act; (5) to 'refuse to bargain collectively with the representatives of his employes.' Representatives chosen by a majority of the employes in 'a unit appropriate for such purposes' shall be the exclusive representatives of all the employes in such unit for bargaining purposes, although individual employes or groups of employes may present grievances to their employer. The right to strike is expressly reserved to the employes. The National Labor Relations Board is authorized to administer the Act, to hear complaints and to issue orders. As an indication of the sweeping authority vested in this Board, the orders upheld by the Supreme Court in the recent cases required the re-employment of discharged employes and the payment of accumulated wages.

"So much for the provisions of the Act; it is equally important to reflect on what it does not require. As pointed out by Chief Justice Hughes, 'The Act does not compel agreements between employers and employes. It does not compel any agreements whatever. It does not prevent the employer 'from refusing to make a collective contract and hiring individuals on whatever terms' the employer 'may by unilateral action determine'. . . . The theory of the act is that free opportunity for negotiation with accredited representatives is likely to promote industrial peace and may bring about the adjustments and agreements which the Act in itself does not attempt to compel. . . . The Act does not interfere with the normal exercise of the right of the employer to select its employes or to discharge them. The employer may not, under cover of that right, intimidate or coerce its employes with respect to their self-organization and representation, and, on the other hand, the (National Labor Relations) Board is not entitled to make its authority a pretext for interference with the right to discharge when that right is exercised for other purposes than such intimidation and coercion. The true purpose is the subject of investigation with full opportunity to show the facts. It would seem that when employers freely recognize the right of their employes to their own organizations and their unrestricted right of representation there will be much less occasion for controversy in respect to the free and appropriate exercise of the right of selection and discharge."

Safety Contest

The following lime plants were announced winners of the 1936 Safety Competition sponsored by the National Lime Association in coöperation with the United States Bureau of Mines:

Galloway plant, Galloway, Green County, Mo., Ash Grove Lime and Portland Cement Co.; 240,920 man-hours.

Berkeley plant, Martinsburg, Berkeley County, W. Va., North American Cement Corp.; 203,322 man-hours.

Hannibal plant, Hannibal, Marion County, Mo., Marblehead Lime Co.; 183,469 man-hours.

Thomasville plant, Thomasville, York County, Penn., J. E. Baker Co.; 114,440 man-hours.

Reddick plant, Reddick, Marion County, Fla., Dixie Lime Products C.; 110,213 man-hours.

Springfield plant, Springfield, Greene County, Mo., Marblehead Lime Co.; 103,752 man-hours.

Quincy plant, Quincy, Adams County, Ill., Marblehead Lime Co.; 91,315 man-hours.

Kimbalton plant, Kimbalton, Giles County, Va., Kimbalton Lime Co.; 86,422 man-hours.

Officers

The following officers were elected for the ensuing year: Henry LaLiberté, chairman, Board of Directors, Cutler-Magner Co., Duluth, Minn.; S. Walter Stauffer, president and general manager, Washington, D. C.; W. V. Brumbaugh, secretary and assistant treasurer, Washington, D. C.; James H. McNamara, treasurer, Eagle Rock Lime Co., Eagle Rock, Va.; Roma F. Medford, assistant secretary, Washington, D. C.

Members of the executive committee are: Henry LaLiberté; Reed C. Bye, American Lime & Stone Co., Philadelphia, Penn.; J. M. Gager, Gager Lime Manufacturing Co., Chattanooga, Tenn.; G. J. Whelan, Kelley Island Lime & Transport Co., Cleveland, Ohio; B. L. McNulty, president, Marblehead Lime Co., Chicago, Ill.

Expanding

LIMESTONE PRODUCTS CORP., Newton, N. J., has installed an additional lime kiln.

Sales Tax Hurts

ALABAMA cement manufacturers have filed a joint bill in the Montgomery County court at Birmingham against the state tax commission, asking for a declaratory judgment exempting carload lots of cement from the 2% sales tax. The petitioners contend that cement is not a finished product within the meaning of the tax law, and that to tax them brings about an unfair competitive condition with manufacturers outside the state.

Shipments Up

PENNSYLVANIA-DIXIE CEMENT CORP., New York City, shipments up to the middle of April were 28% ahead of the same period in 1936, John A. Miller, president, told stockholders at their annual meeting. N. Baxter Jackson, vice-president, Chemical Bank and Trust Co., New York City, was elected a member of the board of directors.

Building Silos

ASH GROVE LIME AND PORTLAND CEMENT CO., Chanute, Kan., plant is constructing eight new cylindrical reinforced concrete silos, of about 14,000 bbl. capacity each, to replace the three present rectangular bins. The new silos will provide for storing some of the new specification cements being demanded for federal government and much private construction. It is expected they will be completed about July 1.

Summer Vacations

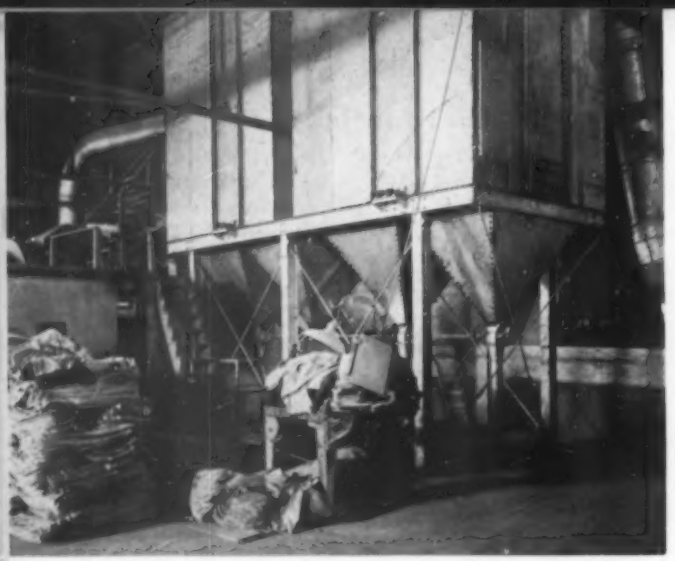
LONE STAR CEMENT CO., New York City, according to local newspapers in towns where its plants are located, has announced:

"All employes having been employed by this Corporation one year or more prior to May 1st, will be given a vacation of one week, with pay, during 1937, at a time reasonably convenient to plant operating schedules.

"Eight hours maximum shall be the working day and forty hours maximum the working week, for each employe. All working time in excess of this will be paid for at one and one-half times the prevailing pay rates."

Suspends Production

SEABOARD SAND AND GRAVEL CO., New York City, is reported to have suspended its operations at Port Jefferson, Long Island, indefinitely, because, it is said, the company cannot produce in competition with other operators at a satisfactory profit. It is rumored locally that the company will be taken over by the Colonial Sand and Stone Co., of which Gene Pope is the guiding genius.



Two dust collectors in pack house

Aetna Portland Cement Company Increases Efficiency by Installing

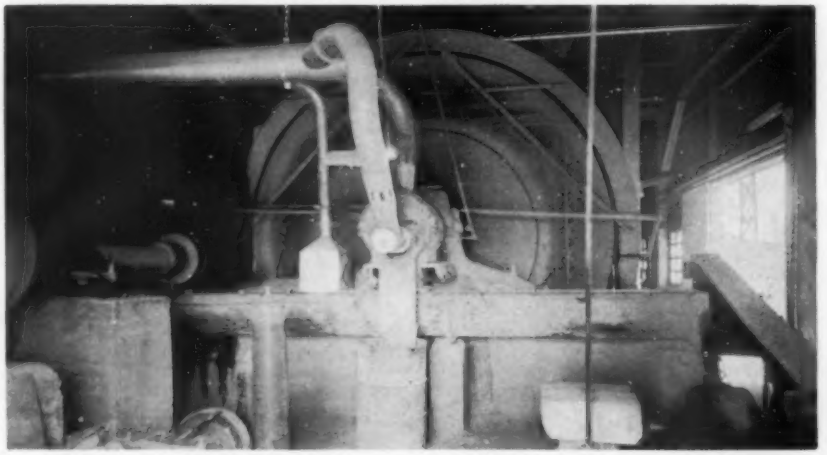
DUST COLLECTORS

and Improves Working Conditions

DUST COLLECTORS recently installed at the Bay City, Mich., plant of the Aetna Portland Cement Co. have improved plant working conditions, bettered the operating efficiency of the packing department and finish grinding tube mills; and they recover much of the fines formerly lost in the form of dust.

A concrete block building was erected adjacent to the dry grinding building to house the new dust collecting equipment for this department. This collector, a No. 56 Blaw-Knox, equipped with a No. 2¼ Clarage fan, takes dust from each of the three 7x26-ft. Compeb mills, operating on the air-swept principle. Air is pulled from the feed ends of the mills toward the discharge ends, where cement discharges to the screw conveyor for transportation to storage. Cooling the grinding process in this fashion has materially improved grinding efficiencies.

This collector is composed of three units, each equipped with a beater. Collected dust is automatically removed, to a 6-in. screw conveyor traveling beneath each unit, by the periodic automatic action of the beaters, and this dust is returned to the main cement screw conveyor traveling from the tube mills to storage.

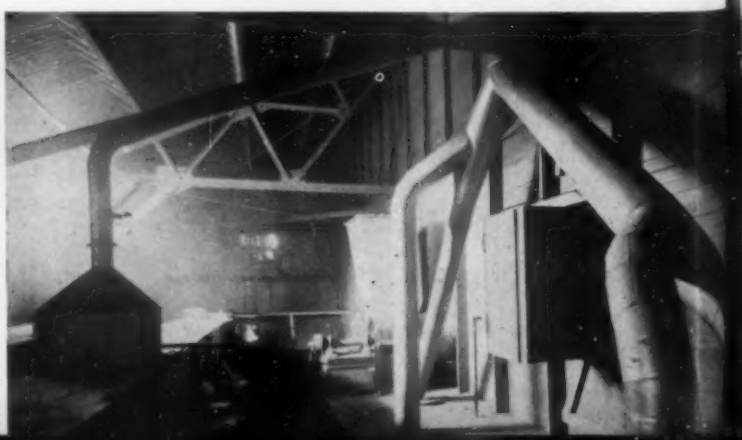


Collector taking dust from finish tube mill as it discharges to screw conveyor for storage

Two No. 32 Blaw-Knox collectors were installed in the packhouse, on the floor directly above the packing machines, hitherto one of the dustiest parts of the plant—as it is with most cement plants today.

One of these units, equipped with a No. 1¾ Clarage fan, serves to take dust from the sack cleaning machine. The four 4-spout Bates bagging machines below are served by the second collector which operates with a No. 2 Clarage fan. Dust is taken from around these machines as well as the dust from spillage. Collected dust returns by gravity from the dust collector to the cement screw conveyor below and goes back through the bagging machines. Adjustable slots are provided in the main ducts of all collectors to reduce temperatures in the dust collecting equipments and bags.

BELOW, LEFT—Dust collector at right removes dust from sack cleaner on left. RIGHT—Leads to the dust collector on floor above packing machines



Small Crushed Stone Plant Made More Flexible By

ROLL CRUSHER

New reduction crusher for agstone. Surge bin is above

Morris Limestone Products Co., Central, Illinois

AN EXAMPLE of a small quarry operation adjusted to meet the rapidly growing demand for agricultural limestone is the Morris Limestone Products Co., Central, Ill., which now has a very flexible operation. The plant was built in 1928, and was remodeled somewhat recently to enable it better to meet the growing demand for "agstone". At present, better than 50% of the output of crushed stone is for agricultural uses. These changes have lowered production costs and stepped up the production.

The quarry is being worked with a 33-ft. face. Drilling is done by Loomis well drills, supplemented by a No. 545 Gardner-Denver percussion drill recently added. During the past year, the method of hauling rock to the primary crusher has been changed from a complete industrial car and track system to a combination truck-industrial car system.

The flexibility of a quarry truck operation for serving the shovel has been gained and the industrial railway and hoist is used merely as an elevator.

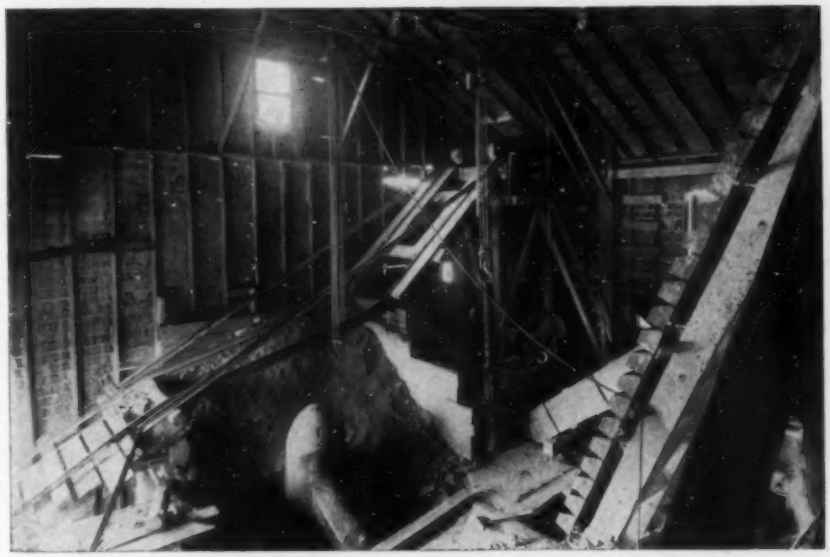
A ¾-yd. Osgood steam shovel loads 5-yd. Mack trucks, which are dumped into the quarry car at the foot of the incline. Stone is hauled to the No. 9 Allis-Chalmers gyratory crusher by an Allis-Chalmers hoist.

Stone is broken to 3½ in. and under and is then elevated by a 76-ft. centers Stephens-Adamson bucket elevator to the sizing screens. Sizing is done over two 3x6-ft., double-deck S.-A. vibrating screens.

To make available more agstone, a Bonnot reduction crusher was recently installed to replace a gyratory crusher. The upper deck of the first sizing screen has 2-in. openings and the bottom deck has 1-in. openings; the throughs from the top deck, retained on the lower deck, are passed through an Allis-Chalmers "Pulverator" to make agricultural stone.

Plus 2-in. stone from the top deck of the screen is chuted to a 12-ton feed bin superimposed over the new crusher. The throughs from the crusher pass to the boot of the same bucket elevator serving the primary crusher and return to the sizing screens.

The minus 2-in., plus 1-in. stone is



ABOVE—Top of primary crusher. Hoist is in background

BELOW, LEFT—View of quarry of Morris Limestone Products Co. Trucks discharge to small car used only for hauling up incline. RIGHT—Quarry and plant using truck and industrial car haulage

chuted to a bin which feeds the Pulverator by gravity. The Pulverator produces about 12 tons of agstone, 95% through the ⅜-in. mesh, per hour. The reduction crusher handles about 20 tons of stone per hour, usually being set for a 1-in. opening. Occasionally the primary crusher will pass thin pieces of rock up to 8 in. in length, which are readily handled by the reduction crusher, which has an intake opening of 4½x24 in.

When making highway surface top dressing stone, the throughs from the lower deck of the first screen pass to the second double-deck screen for sizing. When the demand for highway material is small in comparison with that for agricultural stone, larger stone may be passed to the Pulverator.

The capacity of the plant is 500 tons of crushed stone a day, and the four bins have a capacity of 460 tons. All orders are shipped by trucks, which also are used to remove stone from the bins for outside stockpiling. Reloading from stockpile to trucks is done by a Haiss loader.

Service Plus

An interesting feature is the service given to farmers in the spreading of agstone on their lands. An arrangement has been worked out whereby the farmer who does not have spreading equipment may have spreading equipment placed at his disposal. The farmer can use the spreader himself, or the company's truck drivers will operate the spreader for him, whichever he desires. Each truck has a special attachment to which the spreader may be hooked if the farmer does not wish to spread the stone himself.

Plant Completed

CUSHING STONE CO., Schenectady, N. Y., has recently completed a crushing and black-top plant at East Branch, near Hancock, N. Y.

Expansion

HERZOG LIME AND STONE CO., Forest, Ohio, is building an addition to its plant to house new machinery and equipment for drying and grinding limestone to be used in the manufacture of finely ground products for asphalt filler, stock feeds, agricultural limestone, etc., as well as "rice size" stone for the steel industry.

Quarry and Plant Sold

SEVERN BACHMAN & SONS CO., Lanesville, Ind., has purchased the quarry and plant of the former CORYDON CRUSHED STONE CO., Corydon, Ind., and will operate it. The agreement is reported to be that the new owner will pay 10c per ton for all stone produced until the plant is paid for—five years being the time limit. If not paid for in five years the seller gains repossession.

The End

ERIE STONE CO. has ceased operation of its Kokomo, Ind., crushing plant, and the local newspaper is bemoaning the fact that this ends one of the city's oldest industries. No stone had been quarried for three or four years; the crushing plant has used stone from the Huntington quarry of the company.

City Installs Large Crusher

CITY OF SPOKANE, Wash., has installed an 11-ton crusher at the city's plant, claiming that the plant is now one of the most modern in the Northwest.

Fatal Accident

AMERICAN LIME AND STONE CO., Bellefonte, Penn., lost two men in a rock slide at its Pemberton, Penn., quarry on May 13.

Back in Stone Business

WHITEHOUSE STONE CO., Toledo, Ohio, has again acquired the services of E. E. Evans to sell its product. He has resigned as president of Builders & Industrial Supplies, Inc., Toledo, to devote his full time to the job. He was associated with the Whitehouse Stone Co. for 20 years, prior to organization of Builders & Industrial Supplies, Inc.

Growing

LEE LIME CORP., Lee, Mass., recently completed construction of a new limestone grinding plant at West Stockbridge, Mass. The company is also reported to be opening another quarry in New Lenox, on the site of an old lime plant, the property having been purchased by the Lee company in 1928. The limestone quarried will be transported to the West Stockbridge plant.

Loses Silicosis Suit

MONTELLO GRANITE CO. of Wisconsin lost an appeal to the state circuit court against a judgment for $20,000 to two employes stricken with silicosis. The granite plant closed in 1933, but reopened under an agreement whereby 51 laborers became partners to take over the business in order to relieve the company from liability for compensation. The judge, in affirming the awards, found the 51 men merely "went through the form of setting up a partnership in the pathetically hungry hope of getting their jobs back." The former compensation act permitted employers or workers to exempt themselves from the law. The 1931 legislature made the act mandatory.

Boosting Agricultural Limestone

OHIO FARMERS used 81% more agricultural liming materials in 1936 than in 1935. But they still use only one-fifth as much as they should, annually. The state university's agricultural department is urging greater use in all the newspapers of the state.

Capacity Increased

AMERICAN LIME AND STONE CO., Bellefonte, Penn., recently increased capacity for production of agricultural limestone by installation of two 42-in. Fuller mills. Storage facilities for pebble quick lime have been increased by completion of a 5500-ton reinforced-concrete silo, 50 ft. in diameter and 125 ft. high, said to be the largest lime storage bin in the world.

New Operation

PAGELAND GRANITE CO., Pageland, N. C., has leased the Bonsell rock quarry and will produce and sell building stone and rip rap, but will not crush stone. J. M. McNair, Rockingham, N. C., is president.

Expanding

BELMONT TRAP ROCK CO., INC., Staunton, Va., is installing new crushers and accessories to produce smaller sizes of crushed stone and to increase the capacity to 750 tons per day.

Sells Telephone Business

KELLEY ISLAND LIME & TRANSPORT CO., Cleveland, Ohio, has sold its subsidiary, the Kelleys Island and Sandusky Telephone Co., to the Northern Ohio Telephone Co. The Kelley Island company's telephone subsidiary was the outgrowth of an inter-plant private telephone system, operated since 1893.

Black Top Plant

PEMBROKE LIMESTONE CORP., Pembroke, Va., is furnishing aggregates and a site for an asphalt road-mix plant to be erected by the Sam E. Finley Co., Atlanta, Ga.

Fire Losses

BLOOMINGTON CRUSHED STONE CO., Bloomington, Ind., suffered the loss by fire on April 25 of its $75,000 plant. Insurance was said to be $30,000.

A. J. SNYDER LIME & STONE CO., Tillson, N. Y., plant was destroyed by fire May 11, with an estimated loss of $50,000. A Diesel-engine power plant in a separate structure was uninjured. The plant was built seven years ago and was said to be operating at capacity at the time of the fire. Andrew J. Snyder is owner.

NATIONAL

INDUSTRIAL SAND ASSOCIATION

Freight Rates
Federal Acts
Research
Silicosis

Are Discussed at Annual Meeting in Washington, D. C.

EXECUTIVES REPRESENTING about 75% of the country's production of industrial sand attended the second annual convention of the National Industrial Sand Association, Washington, D. C., May 18 and 19. The proceedings began with an executive session of the board of directors, where association policies were reviewed and formulated for the coming year, a budget and scale of dues adopted, and the nominating committee appointed.

An increase in dues of 50% was proposed and adopted for the ensuing year, proportionate to increased activities to be undertaken by the association. The highly efficient work of the 1936 officers and board of directors was commended, and it was voted that these men retain their offices.

Officers

Officers are A. Warsaw, president, Chicago, Ill.; R. G. Hay, vice-president, Zanesville, Ohio; and L. M. Hansen, treasurer, Chicago, Ill. Members of the board of directors are E. J. Beyer, Rockwood, Mich.; P. S. McDougall, Ottawa, Ill.; Mark T. McKee, Detroit, Mich.; A. J. Miller, New York, N. Y.; Ralph T. Stevens, Cape May, N. J.; W. J. Woods, Lewistown, Penn.; V. P. Ahearn, executive secretary, Washington, D. C.; and Stanton Walker, director of engineering, Washington, D. C.

A. WARSAW presided at the open meeting; and in his address related how the association through organized effort could more effectively and economically act for producers than each could act for himself independently. He mentioned the association's efforts to combat the carriers' attempt to increase freight rates, and the need for further study and research on silicosis, both from the standpoint of the producer and the user, to combat propaganda which, if allowed to go unanswered, might lead toward the substitution of other materials by some purchasers where silica products are now being used.

Freight Rates

W. W. COLLIN, JR., Pittsburgh, Penn., association counsel in the current freight rate proceedings before the Interstate Commerce Commission, in his talk, "The Case of the Industrial Sand Industry in Ex Parte 115 of the Interstate Commerce Commission," told what steps were being taken for defense in preparation of the industry's case and pointed out factors which would influence the prospective outcome when a decision is made by the Commission.

Mr. Collin said that the railroads were asking for a permanently increased base rate purely from a revenue point of view, claiming the need for more money, and that producers of industrial sands were being made defendants by the railroads, and as intervenors must submit their findings from investigation and testify in their defense.

Blank & Stoller, N. Y.
A. Warsaw

In the case of the heavy industries, involving the shipment of steel, petroleum, ore, cement, lime, etc., the carriers have already completed their testimony requesting increased rate charges, and the shippers are now preparing their testimony in defense, according to Mr. Collin.

The outcome of this case will undoubtedly exert an influence on the decision to be made by the Commission when petitioned for freight increases on industrial sands, which are not yet up for discussion. Mr. Collin said that the Commission had said that ample time will be given shippers to prepare testimony after the carriers have given theirs, before a decision is handed down. Mr. Collin believes that the decision of the Commission three years ago on rates to be charged for transportation of silica, when high rates were charged in depression years, should stand the association in good stead now when times are fairly prosperous.

He believed that the decision to be made in the so-called heavy goods case now under consideration could bear watching and would have considerable bearing on future cases, since the status of more than one-half of the total carrier revenue will be decided on first. If this case is won by the carriers, chances for no increase in industrial sand rates should be favorable, according to Mr. Collin, and if the petition is denied in the case of heavy goods, the case of industrial sand might even be dropped completely.

Legislation

"The Political Scene in Washington" was the subject of V. P. AHEARN, executive secretary of the association, wherein he summarized what, in his opinion, is in store for the immediate future. Mr. Ahearn's talk dealt with legislative measures of general interest

to the industry and also with those likely to have a direct effect upon the future of the industrial sand industry.

He discussed five important cases in which the United States Supreme Court has upheld the application of the Wagner Labor Disputes Act, and said that employers, while not required to sign agreements and contracts, should bargain collectively with employe groups and strive for reasonably harmonious relations.

In discussing the Robinson-Patman Act, Mr. Ahearn said that there were 20 cases up for hearing before the Federal Trade Commission, and that there is need for some judicial interpretation to know what to do in cases of alleged violation. He said, to simplify the Act, that if nothing is done to injure competition, or nothing tending to create a monopoly, and that if benefits are received unknowingly, there is no violation.

The Walsh-Healey Act has been amended to include government contracts above $2500, where $10,000 was the original figure and bids by dealers are required to be accompanied by a certificate to show that the producers of materials had complied with its provisions. The overtime rate of time and a half is to apply on a 40-hour week rather than on an 8-hour day and a 5-day week. Mr. Ahearn believes that the new act will be passed and that it will be permanent. In closing, he said that there was likelihood of an attempt to increase taxes to offset deficits in the national budget.

Need for Research

STANTON WALKER, director of engineering, in a paper "Significance of Research to the Industrial Sand Industry," defined the purposes of research, told of its values and applications and outlined necessary procedures and studies to be undertaken in a well-planned research program. Mr. Walker pointed out that research cannot be carried out spasmodically and must be a continuous process representing a persevering pursuit of information. He pointed out that most of research has to do with simple things and the developing of a little further information on a subject on which something is known, modifying this and that conception while reaching out for a little better understanding.

He emphasized that the progress of every successful industry is based on research, whether it be carried out by the consumer or by the producer, and he said that the industry which depends solely on consumer research may awaken and find that other products have been developed which will serve the purpose just as well.

Underwood & Underwood, Washington, D. C.
R. G. Hay

Those investigations having to do with special processes, plant control and the like, and the application of the results of coöperative research were pointed out as belonging with the individual company research organization; while those problems which are common to all, or to a group of the industry, or which involve industry relations with the public or the consumer should be undertaken coöperatively.

Mr. Walker pointed out that coöperative research eliminates much costly duplication of effort, and the value of having an organization which can speak authoritatively for the industry as a whole. Other advantages mentioned were bettered industry relations created through organization, benefits to the consumer with the consequent wider use of industry products and—most important of all—protection against invasion by competitive industries.

Desirable research for such an organization as the National Industrial Sand Association was classified as follows:

(1) Investigations related to the production and use of products of the industry—engineering research.

(2) Investigation of facts pertaining to industry operation—accident prevention, accounting methods, production and price trends, working conditions, employer-employe relations, etc.

(3) Investigations of market trends; where the product goes; present and future requirements as to quantity, quality and type.

Silicosis

One entire session was set aside for a symposium on silicosis, with speeches on the engineering, medical and legislative phases of the disease by prominent authorities. The symposium opened with a paper, "Medical Phases of the Silicosis Problem," by DR. A. J. LANZA, assistant medical director, Metropolitan Life Insurance Co., New York, N. Y.

Dr. Lanza placed emphasis on the use of pre-employment physical examinations and warned that there will not be enough "Class A" men to go around if such examinations are made too highly restrictive. Then the purpose of examinations will defeat itself. Dr. Lanza believes that pre-employment medical examinations are valuable in disclosing diseases of the respiratory system, to eliminate the tubercular employe from work in operations exposing him to the silica dust hazard. He also endorsed periodic examinations of men whereby the progress, if any, of a silicotic condition can be detected.

He definitely stated that tubercular workmen should not be allowed to work on jobs subjecting them to the silicosis hazard, for their own good, and for the good of the employers and the protection of other employes. The attitude of the medical profession toward silicosis should be positive, in that every attempt should be made to keep a man in employment, but if examination of an employe reveals a tubercular condition, that employe should be taken out of the industry. Where periodic examination revealed progress in a silicosis condition, that employe should be transferred to another job.

Dr. Lanza said that silicosis was by no means a hopeless disease, and that eventually it will take care of itself. He pointed out that industry is rapidly learning how to control dust. He said that dust concentrations are being brought down to the point where no harm will be done in an average employe's lifetime. He believes that there should be no compensation paid for partial disability, since uncomplicated silicosis is not disabling.

In closing, Dr. Lanza told of developments being made in recent months, based on various theories, to control silicosis. One theory being worked out is the rendering of silica dust less harmful by mixing with other dusts to counteract its effect. Another development now under study is the hospitalization of silicotic patients in Ontario, where experimentation is being done on the theory that the thyroid gland has some control over the progress of silicosis.

Engineering Control

WARREN A. COOK, chief industrial hygienist, State of Connecticut Department of Health, Hartford, Conn., spoke on "Elimination of Silicosis Through

Engineering Control." Mr. Cook brought out some of the highlights of the report of the National Silicosis Conference. He said that the "silver lining" for producers of silica sand is that it is not necessary to get rid of all dust, but to control concentrations to safe limits and to limit the time of exposure, both of which are possible. He said that the problem of silicosis was twofold, in that control was important to the producers themselves and the users must be protected.

He told of the various ventilation and respiratory methods of control and said that it was the intent of the committee on engineering control to disseminate the known methods and to stimulate new ideas.

In speaking of plant structures, Mr. Cook said it was desirable to enclose dusty operations so that some method of control can be applied at the source. A supply of filtered air was recommended for a crane operator operating for long periods of time in a dusty atmosphere. In the use of wet methods, the importance of intimate contact of dust with the water, and maintaining the process, were brought out. In some cases, the use of respirators was recommended as being the most economical method, where exposure is brief and intermittent. This practice could apply at the foot of a crusher where the concentration might reach 100 million particles.

Legal

THEODORE C. WATERS, chairman, Maryland Rehabilitation Commission, Baltimore, Md., opened his paper, "State Legislation on Occupational Diseases," by saying that one thing definitely accomplished by the National Conference on Silicosis during the past year is the allaying of the industrial hysteria that existed a few years ago. He said that the problem of silicosis has been found to be not as serious or acute as had been popularly believed and that the existence of the disease in industry had been exaggerated.

Mr. Waters discussed a few of the subjects that are, at the present time, receiving particular consideration in pending legislation.

Mr. Waters pointed out legislative provisions that have been and are being introduced into the laws of many industrial states, with emphasis on:

(1) Compensation for partial disability.

(2) Imposition upon an employer of costs for potential liability existing among employes at the time of the enactment of the proposed legislation.

(3) Provisions for creation of medical boards.

(4) Provisions relating to physical examinations of employes.

Mr. Waters discussed the provisions of the New York Act now effective. Compensation for partial liability was denied by the Act. A limitation of liability upon the employer of $500 for the disability of an employe occurring during the first month after the Act becomes effective was set, with progressive increases at the rate of $50 per month thereafter, until a maximum benefit of $3000 is reached. In this plan, the cost of accrued liability may be absorbed by an employer over a period of years. Provision is made for the appointment of medical examiners to serve in an advisory capacity to the Industrial Commissioner or the Industrial Board, to determine necessary medical facts.

Section 65 of the New York Law declares the policy of the legislature of the state to be: ". . . to prohibit through every lawful means available, any requirement as a prerequisite to employment which compels an applicant for employment in any occupation coming within the purview of this Article to undergo a medical examination."

At the 1937 session of the Ohio Legislature, the Occupational Disease Compensation Law was amended to include silicosis, the provisions being modeled upon the New York Law with minor deviations. Of significance, according to Mr. Waters, in the Illinois Occupational Disease Act of 1936, under "accrued liability" is the provision whereby an employe who had contracted silicosis might waive full benefits, and while continuing in employment, receive 50% of the compensation which, but for such waiver, would have been recoverable from the employer.

An amendment to the Workmen's Compensation Act in Rhode Island, modeled upon the New York Law, was vetoed by the governor. In Pennsylvania, there is now pending an Occupational Disease Bill. In its present form, compensation will be provided for any type of disability. It also develops a new method of treating the problem of accrued liability. During the first year the Act is effective, the employer pays one-fifth of the compensation for injuries that become disabling during that year and the state pays the remaining four-fifths. During each succeeding year, the liability of the employer increases at the rate of one-fifth while the Commonwealth's liability is diminished one-fifth, until at the end of the 5-year period, full liability is imposed upon the employer for injuries occurring thereafter.

The basic theory of the Workmen's Compensation Acts, according to Mr. Waters, is to provide compensation only for actual disability, and in the administration of any proposed Occupational Disease Bill it is submitted that the dust diseases should not be compensable unless accompanied by infection. Also, upon making the law effective, there is immediately imposed upon the employer liability for injuries the employe has sustained in the past. By the creation of medical boards, conflicting medical opinions would be decided by a competent, qualified and impartial agency. Mr. Waters concluded by saying the medical committee of the National Silicosis Conference recommends physical examinations for the prevention and control of silicosis.

The symposium on Silicosis concluded with a talk by H. B. MELLER, managing director, Air Hygiene Foundation, Pittsburgh, Penn., who told the purposes of the organization, what had already been accomplished and what studies are to be undertaken in the future. He said that the purposes of the Foundation are to conduct and stimulate problems in air hygiene, to collaborate with other organizations in research and to disseminate information from these studies.

Concluding Session

The final session opened with a report of the research committee by E. O. SCHNEIDER, who told of the need and readiness of the association for a research program. Following this report, L. M. Hansen, treasurer, read the financial report and submitted a budget for the coming year representing a 50% increase in dues. The budget was approved unanimously.

The convention closed with a free and frank discussion by all in attendance on the subject of employer-employe relations.

Sold

GREAT LAKES SILICA CORP.'s steamer *Jupiter* was sold recently by the United States Marshal at Cleveland, Ohio, to Blake Womer, Cleveland, who will operate it as a bulk carrier.

Changes Ownership

H. J. STANNERT SAND CO., near Sunbury, Penn., has been purchased by M. A. Hummel, who will operate it.

Expands

OHIO SAND AND GRAVEL CO., Columbus, Ohio, L. L. Aller, president, reported at the company's recent annual meeting that the plant had been rebuilt to take care of increased business and that a still larger increase was anticipated.

LARGEST AND MOST COMPLETE

FLOATING SAND and GRAVEL PLANT

To Fill American Aggregates Corporation's Contract for TVA's Guntersville, Alabama, Dam Aggregates

By FRANK M. WELCH
F. M. Welch Engineering Service,
Greenville, Ohio

IN THE SPRING of 1936 the American Aggregates Corporation, whose main office is at Greenville, Ohio, closed a contract with the Tennessee Valley Authority to furnish the sand and gravel for the construction of the Guntersville dam near Guntersville, Ala. The contract provided for the constant delivery in proper proportions of about 4000 tons of aggregates per day, under penalty of $720 per day.

The requirement of three sizes in the pebble aggregate and two sizes of sand, with the sand split at the 30-mesh, together with the proper gradation within each size, presented a very unusual undertaking. The following sizes of material were to be furnished:

GRAVEL	SAND
4 in. to 1½ in.	No. 4 to No. 30
1½ in. to ¾ in.	No. 30 to No. 100
¾ in. to No. 4	

The total contract required the furnishing of approximately 500,000 tons, consisting of the above gradings in various proportions, all of which were to be taken from the bed of the Tennessee River in the vicinity of the dam site. Certain tolerances were permitted, resulting in a rather simple problem of separating the gravel as specified, but requiring a considerable amount of ingenuity to split the sand on the 30-mesh within the required limits, and at the same time eliminate leaves, twigs, small particles of drift wood and other trash.

The American Aggregates Corporation has, and is operating, nine 16-in. suction dredges of its own design and construction, five of which have been operating as excavating units during the past 15 years in some of the company's gravel plants in Ohio, Indiana and Michigan. The other four have been converted into seaworthy craft and have been almost continually employed on federal and private dredging, channeling or aggregate contracts since 1932.

Diesel Dredge

While most of these dredges are electrically powered, two of those used in such contract dredging are equipped with 800-hp. Superior Diesel engines. Inasmuch as electric power was not available at the Guntersville operation, one of these Diesel-operated 16-in. dredges, the *Columbus*, was selected to pump the sand and gravel from the bed of the Tennessee River.

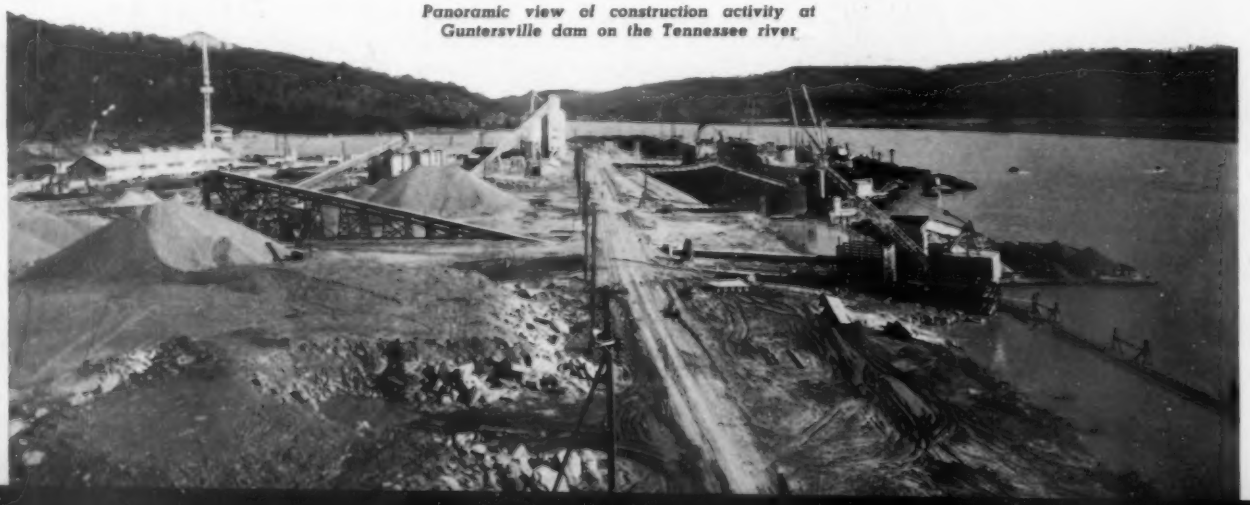
This dredge pumps the material through about 250 ft. of 16-in. pipe line supported on steel pontoons, to the floating gravel plant. This arrangement permits the excavation carried on by the dredge to cover a considerable area, with the screening barge remaining on one location. The delivery of the material from the deposit to the floating plant by this method is quite unique.

Floating Screening Plant

The floating gravel plant throughout is of steel construction, mounted on a 27-ft. x 135-ft. x 8-ft. 6-in. steel hull. It is held in position by three spuds and two anchor lines, the spuds and anchor lines being operated by electric-powered hoists. Electric current is generated by the Diesel engine on the suction dredge in sufficient quantity to operate not only the dredge but all machinery in connection with the floating gravel plant. The electric power is conveyed from the suction dredge to the screening plant through a marine cable carried along with the discharge line on the floating pontoons.

In a general way the materials are handled through the operation somewhat as follows. The delivery of the 16-in. stream of water and sand and gravel, from the deposit, is made

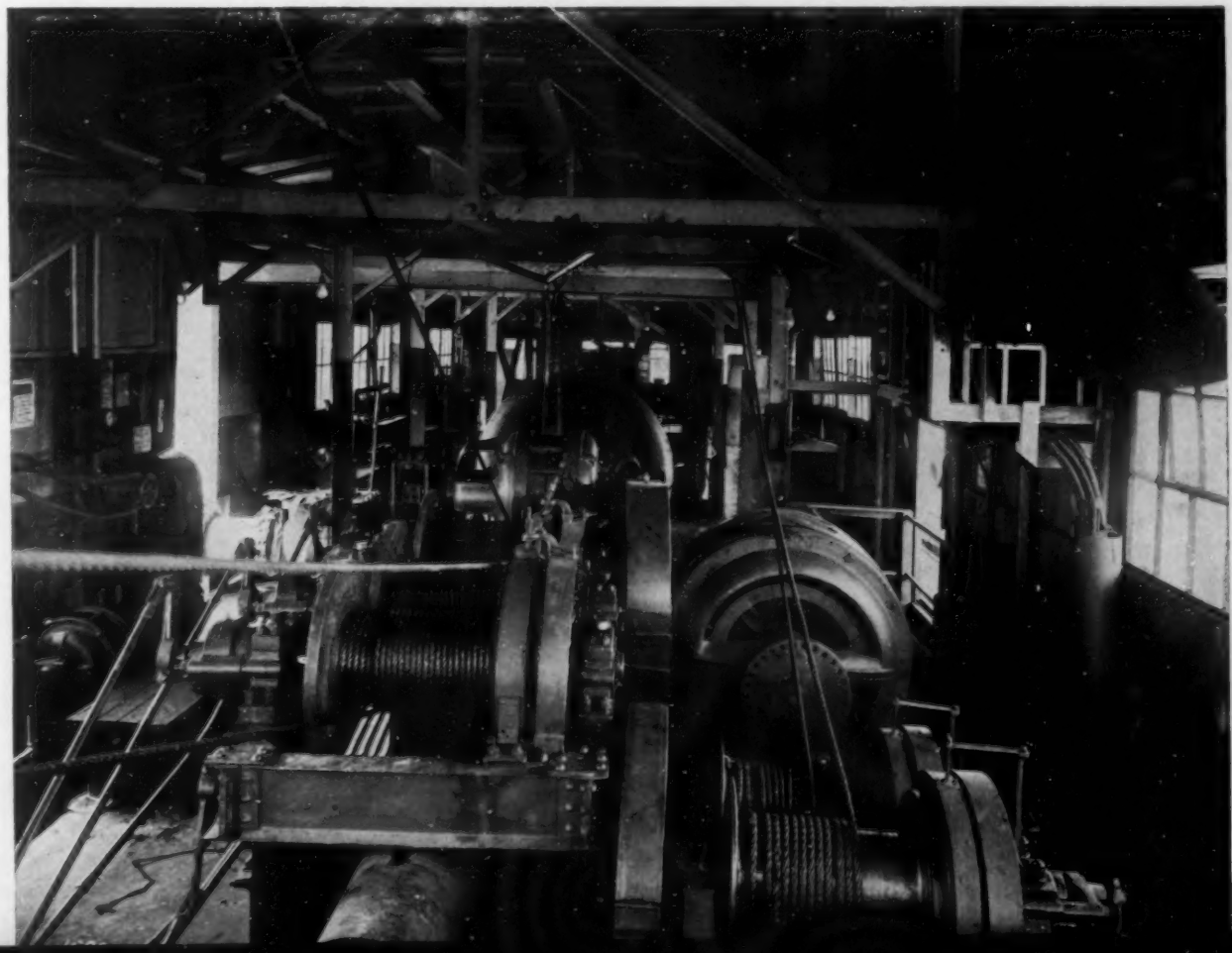
Panoramic view of construction activity at Guntersville dam on the Tennessee river

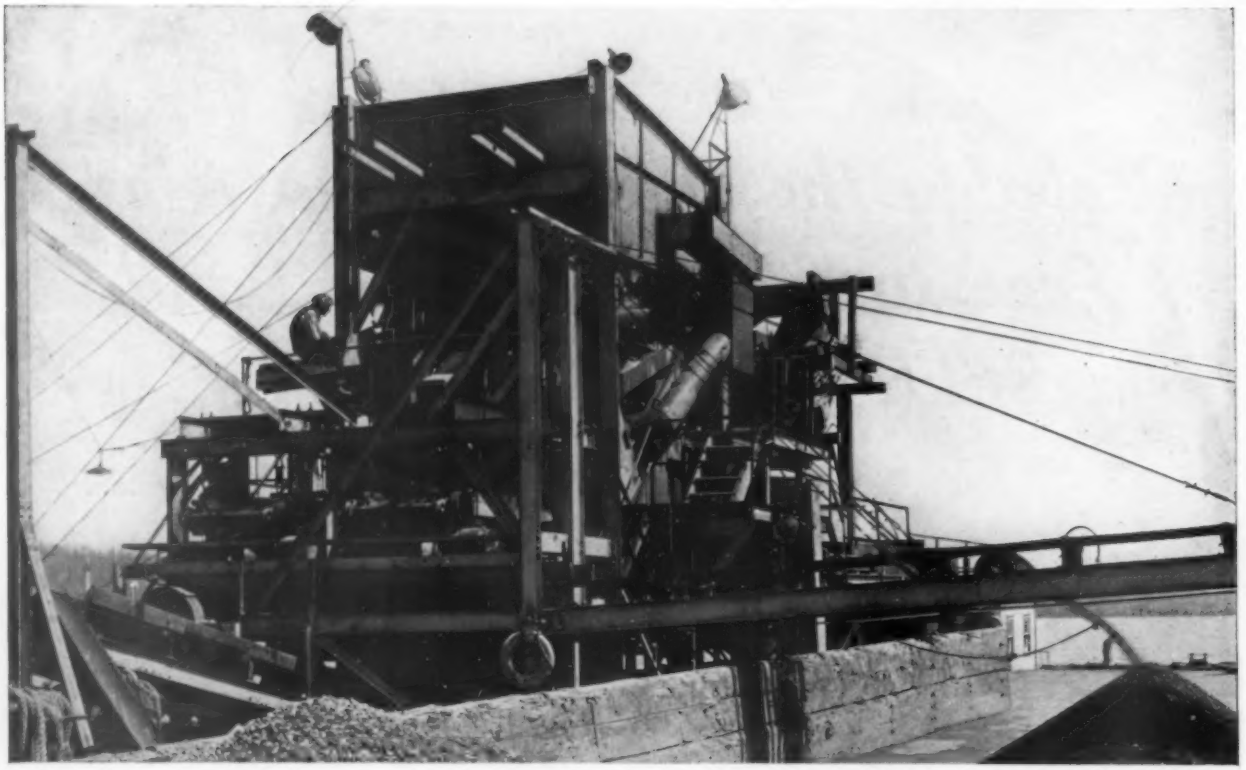


Probably the Only Floating Plant Ever to Make Accurate Sand Split on 30-Mesh Screen

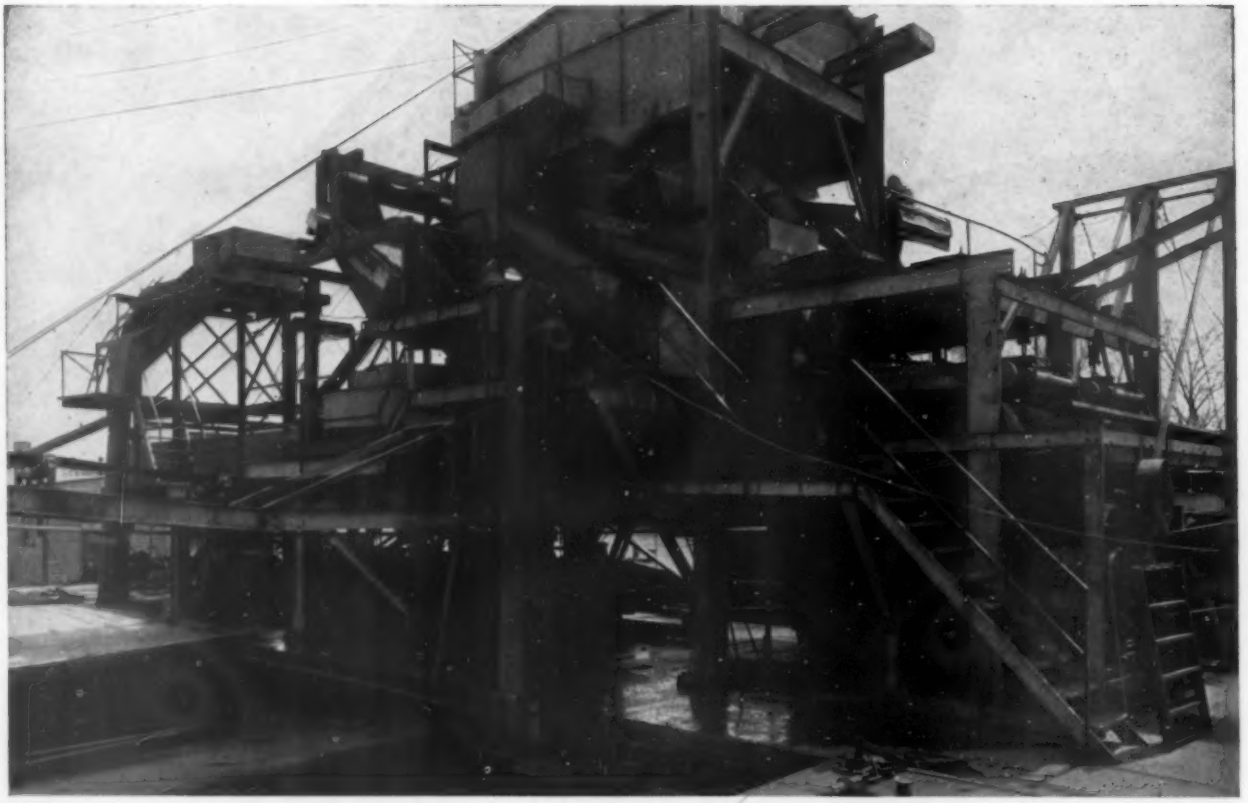
The dredge "Columbus" pumps material through 250 ft. of 16-in. pipeline to the floating screening plant at left and furnishes electric power for whole operation

View inside the dredge, showing the 800-hp. Diesel engine and pumps

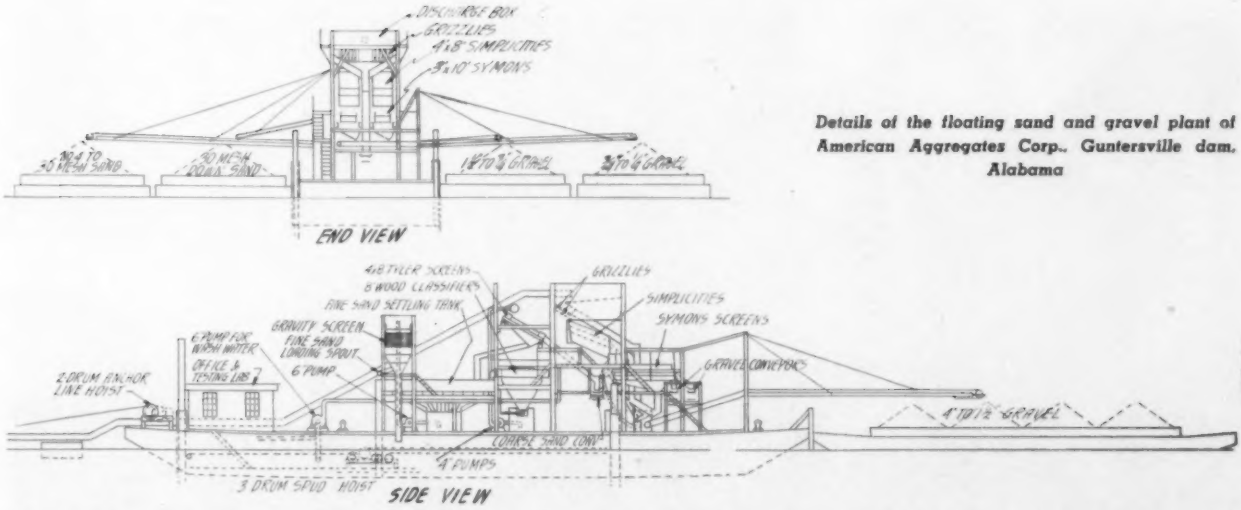




End view of screening plant; gravel conveyor at right



Screening plant, showing horizontal vibrating screens at the right



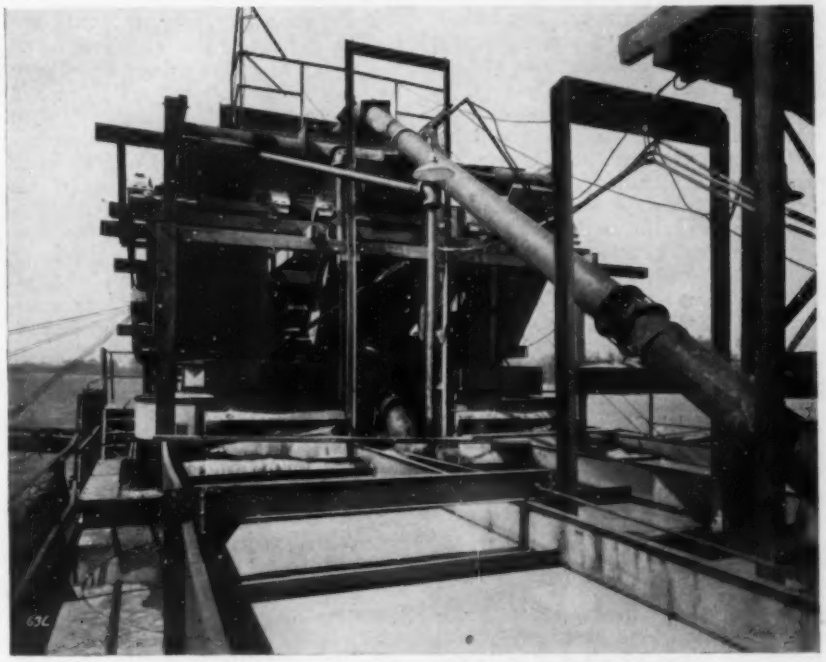
Details of the floating sand and gravel plant of American Aggregates Corp., Guntersville dam, Alabama

through the discharge line to a spreader box or surge box, mounted 28 ft. above the deck of the screening barge. By the use of woven mesh wire cloth around the edge of the discharge box, a large amount of water and fine sand is removed. The coarser particles and remaining water then pass over grizzley screens for the removal of the oversize and further reduction of sand and water before the coarser materials reach the various vibrating screens.

Two initial vibrating screens, manufactured by the Simplicity Engineering Co., each with three decks, complete the screening of the 1½-in. to 4-in. pebbles. The materials between 3/16 in. and 1½ in. pass from the Simplicity screens on to two Symons horizontal vibrating screens, made by the Nordberg Manufacturing Co. The finished products from the Simplicity screens, as well as from the Symons screens, are discharged on to conveyor belts, which in turn deliver the separate sizes to the barges.

The 3/16-in. down sand, which has been removed by the use of the fencing around the discharge box, also by the coal bar grizzley screen and by the bottom deck of the Simplicity screens, together with the water, flows into two 8-ft. diameter Wood classifiers, manufactured by the Nordberg Manufacturing Co. These classifiers are set to split the sand at 30-mesh. Owing, however, to the great quantity of water from the 16-in. pump and the variations in the deposit, further mechanical screening is required to insure both the coarse and fine sands being produced within their tolerances.

The Wood classifiers function as a means of separating the coarse sand from the water. This coarse sand is drawn from the classifiers into a settling tank and pumped from this tank by means of three 4-in. centrifugal pumps on to three Tyler 400-Class vibrators. By the use of these Tyler vibrators, equipped with 26-mesh cloth, it is possible to complete the removal of the 30-mesh down sand from the coarser sand. The coarse sand which passes over the top of the Tyler vibrators is delivered on to a conveyor which in turn delivers it into a barge.



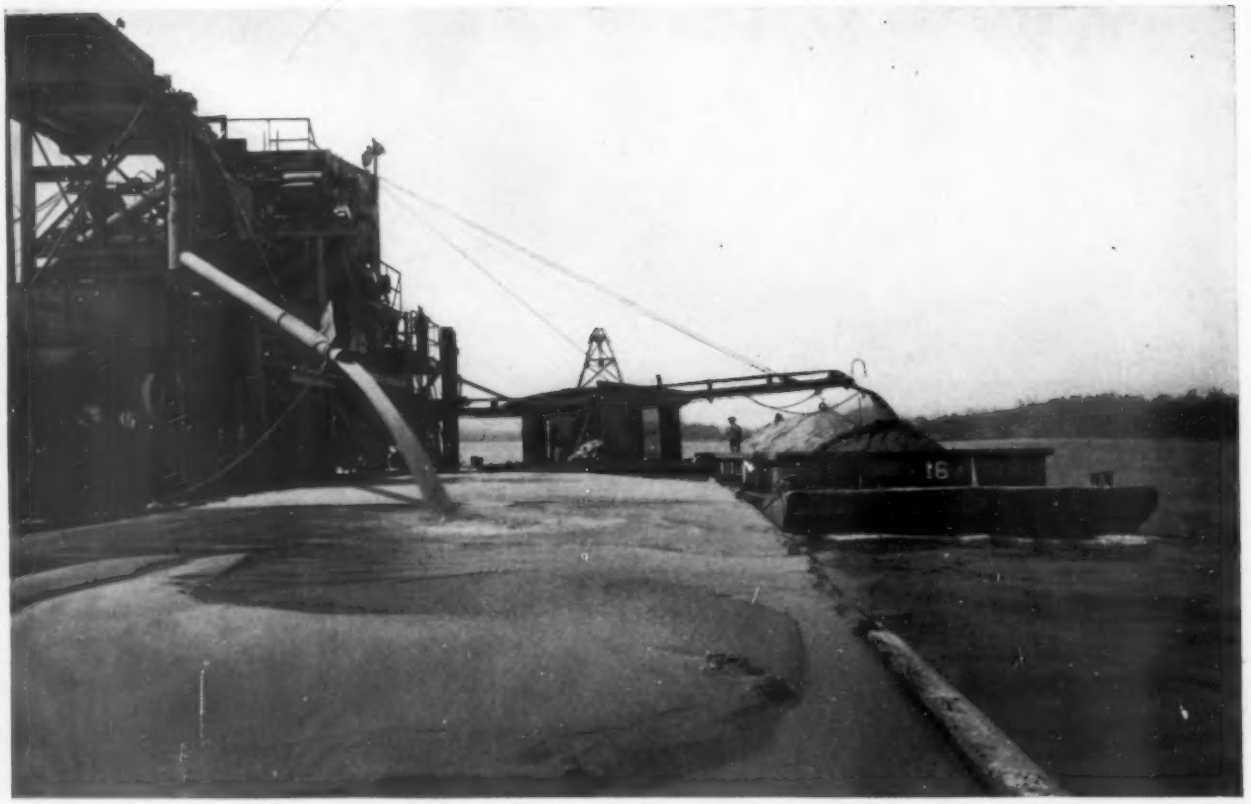
Fine sand settling tank; vibrating screen battery and below, tops of Wood classifiers

Fine Sand Recovery

The 30-mesh down sand, which has been removed by the Wood classifiers and the Tyler vibrators, is delivered with all of the water into a large settling tank measuring 22 ft. in width, 24 ft. in length. The water in this tank is only 2 ft. deep, with the exception that a large portion of the bottom area opens into steel pockets.

At the intake end of the settling tank for the fine sand, a weir box has been provided to accomplish an equal distribution of sand and water over the entire width of the sand-settling tank. The water flows from this weir box 24 ft. across the tank and overflows into a trough connected to two 16-in. pipes discharging into the river.

The fine-sand settling tank is equipped with baffles which create currents at certain points and retard the flow at others. This permits regulating the consistency of sizes contained in the 30-mesh down sand, as any portion which collects in the different pockets can be wasted. This makes it possible to produce almost any combination of sizes below the 30-mesh.



An 8-in. pivoted pipe carries material to the barge for fine sand

The fine sand which is drawn from the settling tank through the steel pockets built into its bottom, is delivered into a smaller tank on the deck of the barge, from which it is pumped by a self-priming 5-in. centrifugal pump to a surge or distributing box about 23 ft. above the deck.

From this box the fine sand, with a regulated proportion of water, flows over a 20-mesh gravity screen which removes trash or any oversize which may not have been previously removed. The fine sand and water passing through this gravity screen are carried by means of an 8-in. pivoted pipe to the barge for fine sand.

Operating Problems

The difficulties encountered at the offset of the operation, were those of removing all of the 3/16-in down sand from the coarser materials, splitting the sand at the 30-mesh, removing the trash from the fine sand, and providing means for regulating the consistency of the various sizes of pebbles as well as sand. A lot of careful study, experimenting, time and expense were engaged in arriving at an arrangement which would, regardless of the consistency of the natural deposit, permit the production of the aggregates within the tolerances required.

These things were difficult to accomplish and at the same time maintain an output of 4000 tons and more per day. The present capacity of the unit as a whole in average deposit, is approximately 250 tons per hour. The task of making the necessary changes from the general design, which included the installing of the three Tyler vibrators, the installation of centrifugal pumps for the rehandling of the sand, the installation of the large settling tank for the fine sand and the gravity screen for the removal of trash—without materially interfering with the output—was necessary in order to avoid the payment of penalties amounting to $720 per day. The corrections, however, were made to the satisfaction of all concerned, with only one day of penalties.

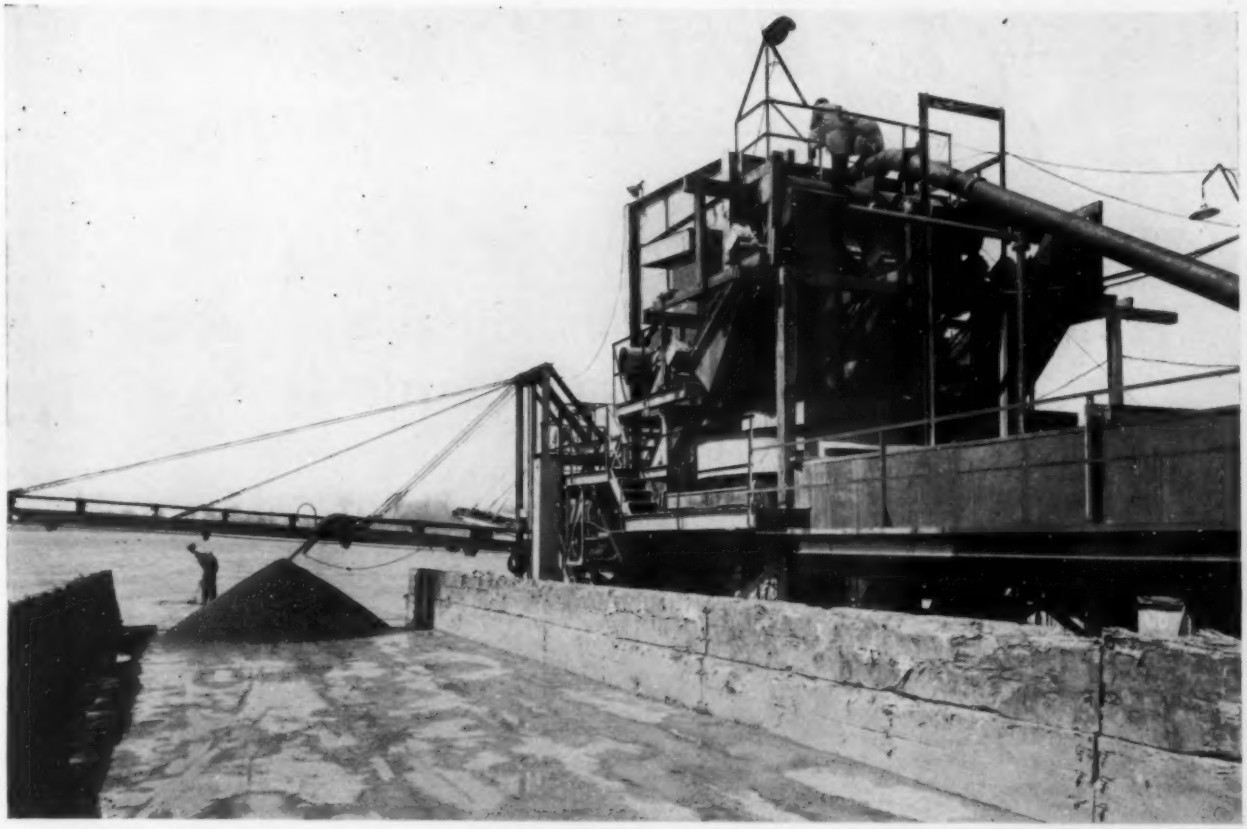
Plant Assembly

The assembly on the screening barge includes a cabin 16 ft. x 20 ft. at the forward end, which is divided into two rooms, one for the TVA inspector with his testing sieves, scales and other laboratory equipment, and the other for the captain. In the captain's quarters are all the switchboards for starting and stopping the various units in the assembly; also here are constructed shelves for small supplies. The larger supplies and repair parts are stored in the hull and are handled by an overhead crane and stairs through a hatchway. Two power capstans, one forward and one aft, are used to shift the barges as they are being loaded.

The Tennessee Valley Authority engineers have demonstrated beyond doubt the advantages and saving in cement by enabling themselves to mix fine and coarse sand in definite proportions in concrete aggregates. This involves accurately splitting, say, No. 4 down sand, at a predetermined point, which on this job was at 30-mesh. Under certain advantageous conditions, where the flow of sand is uniform and the quantity of water can not only be limited but constantly controlled, fairly accurate splitting has been previously accomplished. As far as can be learned, however, such fine and perfect grading of sand in such limited space and under such conditions as prevail at Guntersville, has never before been accomplished..

The plant is served by a fleet of barges. The tow boat *Rita*, plying between the plant and the unloading docks at the dam, shifts the barges and keeps an advance supply of finished aggregate at the construction mooring. A work boat and two steel gasoline launches complete the set-up.

At the construction site of the dam a



Gravel loading side of screening plant at Guntersville dam

very modern unloading, mixing and transporting system has been designed and installed by the Tennessee Valley Authority engineers. It includes storage sufficient for approximately six months' operation of the three grades of sand, as well as cement, and embraces the most efficient and practical reclaiming equipment.

The floating gravel plant was designed by the F. M. Welch Engineering Service, Greenville, Ohio, in collaboration with officials of the American Aggregates Corporation.

Changes Owners

RANSOM SAND AND GRAVEL CO., Eugene, Ore., was recently acquired by Louis Johnson, who has made numerous changes and additions to improve the quality of his products.

Receiver Appointed

BROOKVILLE GRAVEL CO., Dayton, Ohio: Local court has appointed Blaine Fleagle receiver.

First Delivery

BECKER COUNTY-SHIELY CO., Cole, Mont., made its first delivery of the season to the Fort Peck dam, on May 4, when 55 cars of gravel were received.

Zoning Controversy

UNITED SAND AND GRAVEL CO., Morrisville, Penn., is in a controversy with the local authorities over a zoning ordinance. The point involved is whether temporary cessation of operations during the depression constitutes "abandonment." The company has resumed operations recently.

Changes Management

EUGENE SAND AND GRAVEL CO., Eugene, Ore., has leased the plant and business of the INDEPENDENCE SAND AND GRAVEL CO., Independence, Ore. Claude Skinner will continue to be superintendent of the Independence plant. The company name will be retained, and considerable new equipment will be added.

New Plant

ROCKYDALE QUARRIES CORP., Roanoke, Va., is reported to be rebuilding its plant on a new location.

Business Sold

BINGHAMTON CRUSHED STONE CO., Binghamton, N. Y., has purchased all the local gravel beds, stock piles and partly prepared material of the Eastern Rock Products, Inc., Utica, N. Y. The latter company is moving all the machinery and equipment to its other plants in Northern New York State.

New Quarry

INDEPENDENT GRAVEL CO., Joplin, Mo., has opened a dolomite quarry a mile north of Sulphur Springs, Ark., the output to be shipped to the company's crushing and screening plant at Carthage, Mo., and marketed for agricultural limestone and glass manufacture.

Sericite

CLINCHFIELD SAND AND FELDSPAR CORP., Baltimore, Md., has leased property near Jasper, Ga., which will be tested for a sericite deposit. If this mineral (a mica) is present in commercial quantities a plant will be built.

Concrete Pavement Yardage

AWARDS of concrete pavement for April, 1937, have been announced by the Portland Cement Association as follows:

Type of Construction	Sq. yd. awarded during April, 1937	Total sq. yd. for year to date May 1, 1937
Roads	3,155,149	10,010,746
Streets	1,164,322	3,375,596
Alleys	20,305	61,664
	4,339,776	13,448,006

Chemists' Corner

SOME EXPERIMENTS AND OBSERVATIONS ON

"Active Lime" and Puzzolanic Reactions in Portland Cements—PART II

By H. R. BRANDENBURG,
Cowell, Calif.

(Part I of Mr. Brandenburg's article was published in ROCK PRODUCTS, *May, 1937, pp. 70-72.)*

EVERYTHING considered, modern cements are so uniform and dependable in their behavior that whenever the question of malperformance of a concrete comes up it is the aggregate rather than the cement that deserves the strictest scrutiny; always providing that the manufacture of the concrete was under capable direction and well performed.

Part of Water in Cement Paste

However, the moment that a clinker is ground into cement and gauged with water it enters a life cycle of vicissitudes over which we have a much more limited control.

It is now that the coincident active forces of hydration and hydrolyzation set in, which is to say that a certain, and for each cement an apparently reasonably definite, portion of the lime is split off from the original compound structure, thereby forming hydrated lime, a water soluble, a highly reactive and also a crystallizable compound.

With this consideration then it is also evident that a certain and very definite amount of our gauging water has been withdrawn from circulation and is now in combination as the hydrate of lime.

Still another portion of our gauging water reacts with the campounds of silica-iron-alumina and lime, in their respective combinations, thereby forming, at least initially so, colloidal compounds, e.g., the so-called hydro-gels, or simple gels.

The remainder of the gauging water therefore functions largely in the capacity of a lubricating body and serves merely to enhance the lubricating effects exerted by the gels; existing in the free and uncombined state it is subject to easy ejection by forces of gravitation, compression and evaporation, and such being the case the water content of a concrete mix should be held no higher than the needs for workability demand.

The gauging water added to a cement for the purpose of forming the cement paste thus plays three distinct and separate roles:

(*a*) The formation of hydrated lime; by a splitting-off process.

(*b*) The formation of gels; in a system comprising SiO_2-Fe_2O_3-Al_2O_3-CaO plus water of combination.

(*c*) Supplying any desired degree of mobility, dependent upon the amount added.

Ignoring time, the above stated generalities hold true for any given portland cement composition; but if also considered as a function of time, then the rapidity and thoroughness with which these various reactions take place must in turn be dependent upon the fineness of a cement.

Splitting a given cement into three fineness fractions and making on each standard 1:3 Ottawa sand, tensile tests, the following results were obtained:

	% by Wt.	Tensile (lb./sq. in.) of fraction	Tensile (lb./sq. in.) of total
Retained on 200-mesh	9.00	35.	3.15
Retained on 325-mesh	11.00	163.	17.93
Passing 325-mesh	80.00	536.	429.00
	100.00		450.00

% of strength contribution to total strength:

Plus 200-mesh fraction	0.7
Plus 325-mesh fraction	4.0
Minus 325-mesh fraction	95.3

The above figures represent the average of several tests run during the course of three years, but are on cements of the same origin.

These and similar tests have indicated that for the development of reasonably early reactivity and quick physical strength we must select particle sizes well below 43 microns.

In the determination of the liberation of the active lime in portland cement pastes and in cognizance of the above stated desideratum, the active lime was determined, plus the originally existing free lime:

(1) On the original cement and at whatever fineness.

(2) On the minus 325-mesh fraction.

(3) And again on the above after autoclaving. (While time and pressure for the autoclaving stage was varied at times to obtain special results, it was generally held at 180-lb. pressure for a period of three hours.)

Experiments conducted along these lines over a period of three years not only confirmed the anticipated relationship between fineness and the degree of active lime generation as against time, but also indicated, for the compositions tested, that the compound composition and the amount of active lime generable therefrom bear a reasonably definite relationship to each other.

Analytical Difficulties

Just how definite this apparent relationship actually is, is the more difficult to answer because our methods of analysis (in view of the relatively unstable and variable conditions of the various

hydrolyzed and hydrated compounds) do not apparently lend themselves to obtaining perfect concordance and reproduceability.

These difficulties are particularly noticeable in the hydrous silicates as appertaining to the determination of active lime; although the addition of finely ground and dehydrated barium chloride as recommended by me several years ago works perfectly on clinkers and cements and considerably improves the accuracy and decisiveness of the titration in the presence of hydrous calcium-silicates and aluminates, even this expedient fails to function perfectly at all times, evidently due to adsorption complexes.

However, from the general and quite unmistakable trend of the results obtained, I do not hesitate to venture the opinion that for a portland cement paste, at normal consistency, and for the composition ranges studied, the trend for equilibrium is in the direction of di-calcic compounds.

If we are also interested in determining the extent and types of combination of the water constituents we may readily calculate from the amount of the active lime determined, the corresponding amount of water of hydration, on condition that the active lime determination is correct.

But, we are furthermore interested in the amount of water combined with the gel bodies; since at least a great portion of this water is in relatively loose combination, the usual recourse to its determination is neither satisfactory nor wholly dependable.

Extraction of the free and wholly uncombined water by absolute alcohol, followed by an ether wash and drying in a stream of CO_2 free air was tried out; concordant and presumably more correct results were obtained.

Practically all of the tests dealing with active lime were made upon neat cement plaques, 2x2 in. square and ½ in. thick, the paste being at normal consistency.

These specimens, following their initial 24-hour hardening period in the moist closet, were stored, submerged in distilled water, in tightly sealed Mason jars; carbonation was carefully guarded against; when found was corrected for.

As desired, these plaques were broken approximately in halves, one of which was analyzed directly, the other half after autoclaving.

The active lime value obtained on the specimen from the plain water storage is considered as the "initial" active lime value; while that obtained after autoclaving has been considered as the "potential" active lime value; this does not, however, necessarily mean the "ultimate" active lime value that the same cement may be capable of generating; it merely refers back to the experimental conditions used.

As an illustration the following analysis of a cement paste will be cited; age 30 days, N. C. at start 22.5%:

Paste "as is"		Paste, calcul. to loss on ign. free basis
18.32	SiO_2	21.85
2.04	Fe_2O_3	2.43
5.72	Al_2O_3	6.82
54.58	CaO	65.18
1.16	MgO	1.37
1.41	SO_3	1.64
16.05	Loss	.....
99.28	Totals	99.29

Active lime found, expressed as CaO	10.33%
Active lime found, expressed as $Ca(OH)_2$	13.65
Water combined as calcium-hydrate	3.32%
Water combined in gels	12.84
Water as free and uncombined	5.86
Potential active lime after autoclaving	14.56% as CaO
Potential active lime after autoclaving	19.22 as $C(OH)_2$

At prolonged periods of storage, a condition that can be duplicated in the autoclave within a very few hours, it has been found that, whereas the free and uncombined water content increases, the water content linked with the gel bodies apparently decreases.

The results in this direction have not in all cases proved sufficiently decisive, but in general the results appear to align with the theory of inner desiccation.

The summary of these investigations would indicate that for average cements, that is average with respect to composition and fineness, the active lime generation lies within the limits of about 14 to 17% Ca $(OH)_2$—hydrated lime.

The active lime figure just given covers the average cement, and as explained, it does not hold true for the finer fractions of that cement nor the coarser; it is a figure merely indicative of what one may expect from an average product under normal and average conditions of usage.

The finer fractions may easily run several percent higher while the coarsest fractions do not appear to be fully attacked even under the autoclaving conditions cited.

Flour, then should be the most reactive portion of a portland cement; the fractions above 200-mesh the least reactive.

From a manufacturing standpoint the production of flour is costly, though in nominal percentages quite unavoidable; from the standpoint of usage the exclusive use of cement flour would likely prove equally undesirable.

The corollary of this would be that the most desirable and probably most perfectly performing cement should contain only such fractional sizes as would make the cement, within the compound limits capable of performing so, as completely as possible available during its setting time cycle, while not interfering with the economics of manufacturing.

My experiments have clearly indicated that reactivity decreases markedly from 43 microns on up, and hence this particle size may be placed as the upper desirable limit of a portland cement particle.

Since essentially complete reactivity can be expected to occur within particle size limits of up to a maximum of 43 microns, within reasonable time periods, we would thereby, conceivably, also tend to eliminate the last bar to certain contentions held with respect to the development of certain ills that cement, at times, is claimed to be heir to, long after the cement has found its way into a concrete mass.

With the present day tendency towards high-lime and low-alumina cements such dangerous possibilities may at times come about, not from overliming so much as from underburning.

(To be concluded)

Active Lime in Cement

THE AUTHOR found that there is from 14 to 17% of free lime (hydrate) in the average portland cement after it has set. The amount varies according to the composition and the fineness of grinding.

Whether or not a silica added as a puzzolana reacts with this free lime hydrate, whether or not the silica in the original cement composition reacts further with this free lime hydrate, is the question.

The answer lies in the great differences experienced with admixtures in various cements—some are benefited, some not; also, as the author points out, there are puzzolanas and puzzolanas.

—The Editor.

HINTS AND HELPS FOR SUPERINTENDENTS

Home-made unloading box is filled with coal in railroad car and transferred to stockpile by a crane boom

Economical Unloading

HANDLING OF COAL from railroad cars to plant storage facilities offers no particular problem where large tonnages are the regular procedure and track hoppers and adequate storage are provided. Occasionally, a plant that does not normally require such handling facilities must take care of large tonnages, when faced with a price increase, a possible shortage of coal, or for some other reasons. Naturally, being unequipped, considerable time and labor are required to handle it manually.

Recently the Standard Silica Corp., Ottawa, Ill., found it desirable to handle and stockpile some 20 or 30 cars of coal in a short period of time. It was necessary either to have men shoveling it from the cars and afterwards distributing it to stockpile by horse and scraper or by hand, or to rig up some device for more economical handling.

The company had on hand a crane boom some 40 ft. in length which could be readily interchanged with the standard boom on a Marion ¾-yd. gasoline shovel, just purchased for quarry stripping. Less than a day was required to build a 7x5x2-ft. box open at the top and on one end. Two 2½-in. steel angle irons were bent to form the frame at the two ends of the box and wood siding and a wood bottom were bolted to the angle iron.

Steel cables from each corner of the top of the box join the main cable from the end of the boom, to hold the box horizontal. The box is raised into the open railroad cars, where four men fill it with shovels. When full, it is raised and swung to the stockpile; a worker changes the hook on the end of the main cable to a ring on the center of the end of the box. The box is then raised and the coal discharges and is distributed from the open end.

Some 2700 lb. of counter-weights are used on the shovel to offset the weight of the boom and the loaded box. The box itself weighs 500 lb. and carries about 2500 lb. of coal. This simple arrangement probably paid for itself in a few days. Two cars are unloaded in 8 hours where only one could be unloaded by hand, and no re-handling is required. Coal is being handled from stock-pile to the boilers by a Koehring Dumptor.

Unloading box is dumped by suspension from ring at one end so that coal falls through open end

Belt Spreader

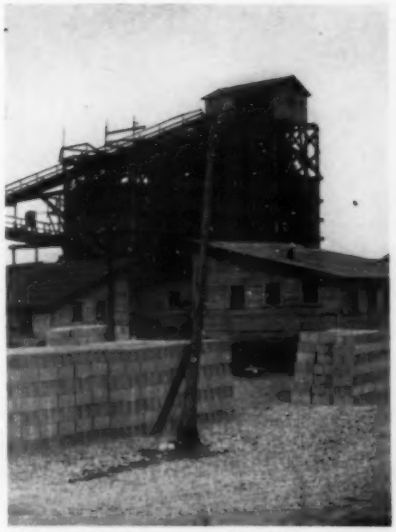
THE ACCOMPANYING ILLUSTRATION shows a device developed at the plant of the Basic Dolomite, Inc., Maple Grove, Ohio, in connection with a Stearns magnetic pulley, to spread the material over the conveyor belt in a thin uniform layer, giving the magnetic pulley a chance.

Rake device ahead of magnetic pulley spreads limestone over belt in uniform layer

Portable Loading Bin

By JOHN F. ROBERTSON,
Superintendent, Cedar Bluff Quarry,
Princeton, Ky.

OUR STOCK-PILING SYSTEM, like Topsy, "just growed" from small beginnings. It started with a dump truck. When necessary to reload from stockpile, we had to remove one of the shov-



A view of old wooden bins, before replacement

els up the 500-ft. incline from the quarry pit. The first addition was the ¾-yd. Bucyrus-Erie gasoline clamshell for loading from stock-pile.

We then found it necessary to build a bin to load trucks. It is of wooden frame construction, holding about 30 tons. Our stock-piles are seven in number and scattered over considerable territory. Portability, therefore, was the chief, and most puzzling necessity, as portability and sufficient capacity are rather difficult to balance.

The construction of the bin is shown in the accompanying illustrations. All of the main frame joints and braces are bolted together with corner irons. The two cross pieces shown at the bottom are for use only in moving the bin to prevent spreading and side strains. They are easily removable, being held in place by drop pins. The bin is moved on skids by the crane.

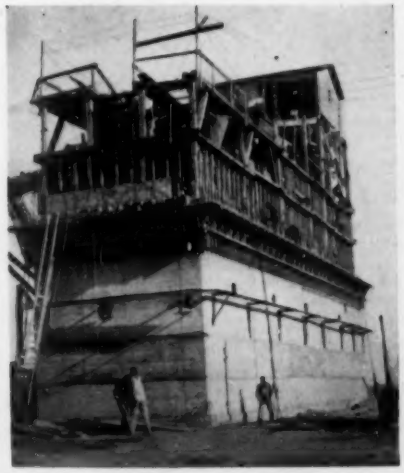
Economical Bins

WHERE NEW STORAGE bins are to be built to replace those supporting a sand and gravel screening plant, much if not all equipment generally must be removed, if the new bins are

Concrete bins were poured over old wooden bins without removal of the heavy screening equipment

to be erected on the original site. Not so at Clear Lake Sand and Gravel Co., Clear Lake, Iowa, where concrete bins were erected to replace wooden ones.

After a little lining up and minor repair, the wood bins were made to serve as the inside forms for the pouring of



Another construction view of the reinforced concrete bins

concrete for the new bins. The new bins are 22x88 ft. and 37 ft. high, divided into five compartments, representing a total capacity of 500 tons. Wall thicknesses are 8 in. on the sides and 10 in. on the ends, and in the partitions. Sectional forms 16 ft. in length and about 5 ft. high were placed completely around the bins and the pouring was done in seven lifts. Steel spacers imbedded in the concrete at each level served to maintain the proper wall thickness and support the forms. Forms were handled by a crane and concrete was elevated in the same way, and poured from a 6-cu. ft. cart. The job was completed leaving much of the heavier equipment in place.

Details of portable, wooden bin of 30-ton capacity. The cross pieces at the bottom prevent spreading and side strains when the bin is moved

Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividends	
Aetna P. C., cap.[61]	5-20-37	16	..		
Allentown P. C. (Penn.), com.[61]	5-20-37	9	..		
Allentown P. C. (Penn.), 6% cum. pfd.[61]	5-20-37	9½	..		
Alpha P. C., com.	5-24-37	27⅝	28	.25(qu.)	June 25
American Aggregates, 1st mtg., 3/6's, 1943, new bonds[62]	5-17-37	50	..		
American Aggregates, 6's, 1943, old[62]	5-17-37	50	..		
American Aggregates, com.[62]	5-17-37	3	4½		
American Aggregates, pfd.[62]	5-17-37	16	..		
Arundel Corp., com.	5-24-37	21	actual sale		
Ash Grove L. & P. C., com.[63]	5-20-37	15⅝	..		
Ash Grove L. & P. C., pfd.[63]	5-20-37	97½	..		
Bessemer L. & C., com.[62]	5-17-37	9	10		
Bessemer L. & C., pfd.[62]	5-17-37	32	35		
Bessemer L. & C., 1st 6½'s, 1947[62]	5-17-37	97½	..		
Bessemer L. & C., 6's, 1955[62]	5-17-37	96½	98		
Boston S. & G., com.[37]	5-17-37	2	3½		
Boston S. & G., 7% pfd.[37]	5-17-37	11	14		
Boston S. & G., 7's, 1929[37]	5-17-37	89	..		
Calaveras Cement, com.[62]	5-14-37	7⅜	8¾		
Calaveras Cement, 7% pfd.[62]	5-14-37	95	100		
California Art Tile, A[3]	5-14-37	22	24	.50(ac.)	June 1
California Art Tile, B[3]	5-14-37	4¾	5		
Canada Cement, com.	5-17-37	16	actual sale		
Canada Cement, pfd.	5-17-37	103	actual sale	1.00(qu.)	June 30
Canada Cement, 4¼'s, 1951	5- 4-37	101½	104½		
Canada Crushed Stone, 5½'s, 1944[42]	5-25-37	101	..		
Carolina P. C., 6% cum. pfd.[51]	5-20-37	40	..		
Consol. Cement, A[51]	5-20-37	7	9		
Consol. Cement, 1st 6's, 1950[50]	5-18-37	84½	86½		
Consol. Okla. S. & G., 6½'s, 1948[52]	5-25-37	30	..		
Consol. S. & G. pfd.	5-17-37	47	65		
Consol. Rock Products, units[50]	5-18-37	1½	2		
Consumers R. & G. 1st Mtg., 6's 1949[51]	5-20-37	40F	..		
Coosa P. C., 1st 6's	5-20-37	50F	..		
Coplay Cement Mfg., units[50]	5-18-37	15	..		
Coplay Cement Mfg., 6's, 1941[50]	5-18-37	95	..		
Cumberland P. C., units[51]	5-20-37	55	..		
Dewey P. C., com.[51]	5-20-37	65	..		
Dolese & Shepard	5-24-37	45	47		
Federal P. C., 5's, 1947[51]	5-20-37	84	..		
Federal P. C., 6½'s, 1941[48]	5-17-37	79	..		
Fla. P. C., units[50]	5-18-37	33	36		
Fla. P. C., 6½'s, 1937[48]	5-17-37	100	..		
Giant P. C., com.[50]	5-18-37	4	..		
Giant P. C., pfd.[50]	5-18-37	19	20		
Glens Falls P. C., com.[51]	5-20-37	..	19		
Glens Falls P. C., pfd.[51]	5-20-37	..	89		
Great Lakes P. C., B[51]	5-20-37	½	..		
Gyp., Lime & Alabastine	5-17-37	15	actual sale		
Gyp., Lime & Alabastine, 5½'s, 1948[42]	5-25-37	102¼	103		
Hawkeye P. C., cap.[50]	5-18-37	33	37		
Hercules Cement, com.[61]	5-20-37	66	73		
Hercules Cement, pfd.[59]	5-18-37	67	72		
Ideal Cement, com.[50]	5-24-37	77	78	1.50	May 27
Kelley Island L. & T.	5-24-37	24	actual sale		
Ky. Rock Asphalt, 6½'s, 1936[46]	5-17-37	45	..		
Ky. Stone Co., v.t.c.[46]	5-17-37	4¼	..		
Ky. Stone Co., 5½, 1954[46]	5-17-37	42	48		
Keystone P. C., pfd.[51]	5-20-37	30	..		
Lawrence P. C., com.	5- 5-37	45	47		
Lawrence P. C., 5½'s, 1942[50]	5-18-37	100½	101½		
Lehigh P. C., com.	5-22-37	37	actual sale	.37½(qu.)	Aug. 2
Lehigh P. C., 4% pfd.	5-24-37	148	150	1.00(qu.)	July 1
Lone Star Cement, com.	5-24-37	56	56½	.75(qu.)	June 30
Louisville Cement	5-23-37	200	250	5.00 declared	May 1
Lyman-Richey, 1st 6's, 1939-40[50]	5-20-37	65	..		
Marbelite Corp., com.[46]	5-14-37	½	¾		
Marbelite Corp., pfd.[46]	5-14-37	4¼	5		
Marblehead Lime, 7's, 1944[14]	5-18-37	94	97		
Marquette Cement, com.	5-24-37	45	50		
Marquette Cement, pfd.[50]	5-18-37	104	..		
Material Service Corp.[50]	5-18-37	19	21		
McCrady-Rodgers, com.[53]	5-18-37	..	6		
McCrady-Rodgers, 7% pfd.[53]	5-18-37	..	25		
Medusa P. C., com.	5-24-37	44½	actual sale		
Medusa P. C., 6% cum. pfd[53]	5-20-37	88	..		

Stock	Date	Bid	Asked	Dividends	
Minnesota Mining & Mfg. Co.	5-24-37	35	actual sale		
Missouri P. C.	5-24-37	20½	actual sale		
Monarch Cement, cap.[51]	5-20-37	100	..		
Monolith P. C., com.[9]	5-14-37	3¼	3¾		
Monolith P. C., 8% pfd.[9]	5-14-37	8	9	.25	May 15
Monolith P. C., 1st mtg.[9]	5-14-37	103	105		
Monolith Portland Midwest, pfd.[9]	5-14-37	2	3½		
National Gypsum, A., com.	5-24-37	15½	15¾		
National Gypsum, 7% pfd.	5-22-37	101	104	1.75(qu.)	July 3
National Gypsum, 5% pfd.	5-24-37	17⅛	19	.25(qu.)	July 3
National L. & S., 6½'s, 1941[46]	5-17-37	96	..		
Nazareth Cement, com.[50]	5-18-37	11	13		
Nazareth Cement, 7% pfd.	5-18-37	95	100		
Newaygo P. C., pfd.[61]	5-20-37	90	..		
New England Lime, units[34]	5-18-37	18	19		
N. Y. Trap Rock, 6's, stamped, 1946	5-24-37	90¾	actual sale		
N. Y. Trap Rock, 7% pfd.[46]	5-17-37	60	..		
North Amer. Cement, 1st 6½'s, 1952[50]	5-21-37	54⅜	58½		
North Amer. Cement "A" pfd.[50]	5-21-37	9	10½		
North Amer. Cement, com. A[50]	5-21-37	5½	7		
North Amer. Cement, 6½'s, 1940[50]	5-18-37	80	..		
North Amer. Cement, 6½'s, 1943	5-21-37	97½	100		
North Amer. Cement "B" pfd.[50]	5-21-37	13	14½		
North Shore Mat., 1st 6's[50]	5-18-37	60	..		
Northwestern P. C., units[9]	5-14-37	72	75		
Northwestern States P. C.[50]	5-18-37	24½	26½		
Ohio River S. & G., com.	5-23-37	1	..		
Ohio River S. & G., 1st pfd.	5-23-37	5	..		
Ohio River S. & G., 2nd pfd.	5-23-37	78	..		
Ohio River S. & G., 6's[46]	5-17-37	15	20		
Oregon P. C., com.	5-14-37	4	6		
Oregon P. C., 1st pfd.	5-14-37	97	..		
Oregon P. C., conv. pfd.[50]	5-18-37	56	..		
Pacific Coast Aggr., new com.[49]	5-14-37	2¾	2⅞		
Pacific Coast Cement, com.[51]	5-20-37	3¼	..		
Pacific P. C., com.[49]	5-14-37	4	4½		
Pacific P. C., pfd.[49]	5-14-37	48	50		
Peerless Cement, com.	5-22-37	6	7½		
Penn.-Dixie Cement, com.	5-24-37	7⅝	8¼		
Penn-Dixie Cement, pfd., A.	5-24-37	51½	57		
Penn.-Dixie Cement, 6's, A, 1941	5-24-37	99¾	100		
Penn. Glass Sand Corp., v.t.c.	5-24-37	25	28		
Penn. Glass Sand Corp., 1st mtg. 4½'s, 1960	5-22-37	104	actual sale		
Petoskey P. C., com[50]	5-22-37	9	11		
Republic P. C., com.[51]	5-20-37	10	12		
Republic P. C., pfd., 5%				1.25(qu.)	June 1
Riverside Cement, A[3]	5-14-37	16½	17½		
Riverside Cement, B[3]	5-14-37	4	4½		
Riverside Cement, pfd[49]	5-14-37	95	97		
Rockland & Rockport Lime, com.	5-20-37	1¼	3¼		
Santa Cruz P. C., pfd[9]	5-14-37	40	42½		
Schumacher Wallboard, com.[9]	5-14-37	5⅝	6¼		
Schumacher Wallboard, pfd.[9]	5-14-37	22	23½	.50(ac.)	May 15
Signal Mt. P. C., com.[50]	5-18-37	2	4		
Signal Mt. P. C., pfd.[50]	5-18-37	74	76		
Signal Mt. P. C., units[51]	5-20-37	76	78		
Southern States P. C., cap.[51]	5-20-37	34	..		
Southwestern P. C., units[49]	5-14-37	190	..		
Spokane P. C., units[50]	5-25-37	12	..		
Standard Pav. & Mat., com.[49]	5-25-37	6	6½		
Standard Pav. & Mat. pfd.	5-17-37	..	42		
Superior P. C., pfd.				1.10(4 mos.)	June 1
Superior P. C., A[46]	5-14-37	46	50		
Superior P. C., B[46]	5-14-37	17¼	18		
Trinity P. C., units[50]	5-18-37	65	67		
U. S. Gypsum, com.	5-24-37	111	111½	.50(qu.)	July 1
U. S. Gypsum, pfd.	5-24-37	156½	160	1.75(qu.)	July 1
Volunteer P. C., 1st 7's, 1942[46]	5-17-37	90	..		
Volunteer P. C., units[46]	5-17-37	75	..		
Vulcanite P. C., com.[46]	5-17-37	9½	..		
Vulcanite P. C., 7½'s, 1943[46]	5-17-37	94½	..		
Wabash P. C.[50]	5-18-37	11¼	12½		
Warner Co., ww. 1st 6's, 1944[46]	5-17-37	86½	87½		
Warner Co., com.[50]	5-18-37	9	10½		
Warner Co., pfd.[50]	5-18-37	21	23		
Whitehall Cement Mfg., com.[51]	5-20-37	85	105		
Whitehall Cement Mfg., pfd.[51]	5-20-37	45	60		
Wisconsin L. & C., 1st 7's, 1940[14]	5-18-37	75	..		
Wolverine P. C., com.	5-24-37	5	actual sale		
Yosemite P. C., 4% pfd.[49]	5-14-37	4½	4⅝		

F = Flat.

Quotations by [9]A. E. White Co., San Francisco, Calif. [14]The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [42]Martin Judge Jr., and Co., San Francisco, Calif. [43]Nesbitt, Thomson & Co., Ltd., Toronto, Ont. [46]First National Bank of Chicago, Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [50]Rogers & Tracy, Inc., Chicago, Ill. [51]Paul D. Sheeline & Co., Boston, Mass.

Recent Dividends Announced

Alpha P. C., com. (quar.)	$0.25	June 25, 1937
California Art Tile, A (accum.)	.50	June 1, 1937
Canada Cement, 6½% cum. pfd. (quar.) (This leaves arrears of $30.50)	1.00	June 30, 1937
Ideal Cement, cap	1.50	May 27, 1937
Lehigh P. C., com. (quar.)	.37½	Aug. 2, 1937
4% pfd. (quar.)	1.00	July 1, 1937
Lone Star Cement, com. (quar.)	.75	June 30, 1937
Louisville Cement Declared May 1	5.00	
National Gypsum, 1st pfd. (quar.)	1.75	July 3, 1937
2nd pfd. (quar.)	.25	July 3, 1937
Penn. Glass Sand, com. v. t. c.	.25	July 1, 1937
Schumacher Wall Board, pfd. (accum.) (This leaves arrears of $9.00.)	.50	May 15, 1937
Standard Silica Corp.	.40	June 15, 1937
Superior P. C., pfd. (for 4 months, ending June 30)	1.10	June 1, 1937
U. S. Gypsum, com. (quar.)	.50	July 1, 1937
pfd. (quar.)	1.75	July 1, 1937

NATIONAL GYPSUM CO., Buffalo, N. Y., stockholders have authorized 100,000 shares of new preferred, of which it is proposed to issue 80,000 shares carrying $4.50 dividends in the near future. Holders of the first preferred stock are to be offered rights to exchange their shares for the new stock on a share for share basis, and holders of second preferred can exchange on the basis of one new share for each five old. In addition to retirement of the first and second preferred stocks, the 4% mortgage note, requiring $1,250,000, will be paid and $769,410 of 6% will be redeemed out of proceeds of the new stock offering.

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KELLEY ISLAND LIME & TRANSPORT CO., Cleveland, Ohio, reported for the calendar year 1936 the best earnings since 1930—a net profit of $423,086 after expenses, depreciation, depletion and federal income taxes, but before provision for surtax on undistributed profits, equivalent to $1.37 a share on 308,952 on par shares of capital stock. This compares with net profit of $327,699 or $1.06 on the same number of shares in the preceding year. An adjustment of sand inventory amounting to $40,386 was made at the end of 1936, which is considered by the management as being principally applicable to prior years and has been charged to surplus.

George J. Whelan, president, in his remarks to stockholders states: "At the time this report is being written, our sales for the first quarter of 1937 are 47% ahead of the like period of 1936, and our net earnings for the first quarter are higher than for any first quarter period for many years. But it is not anticipated that the full year will show as large a proportionate increase as the first quarter. Unusually favorable weather conditions greatly stimulated winter construction, and the absence of heavy ice on Lake Erie, together with demands for early delivery of waterborne materials, has increased our shipments more than normally during the first quarter. General conditions have greatly improved. The steel industry, on which we depend for consumption of our fluxing stone, has been operating at a very high rate and all indications point toward a continuation of greater activity in all lines throughout the year."

INCOME ACCOUNT

	1936	1935
Operating income	$ 852,557	$701,420
Depreciation and depletion	190,627	145,486
Operating profit	661,930	555,934
Selling, general, etc., expense	236,337	207,153
Net operating profit	425,593	348,781
Other income (net)	57,199	23,307
Total income	482,792	372,089
Federal taxes	59,706	44,390
Net profit	423,086	327,699
Dividends	411,129	216,266
Surplus for year	11,957	111,433
Surplus, Jan. 1	927,863	816,431
Credit adjustment	121,178	.....
Surplus, Dec. 31	1,060,998	927,864
Earned per share	$1.37	$1.06

Note: No provision has been made in above statement for net operating loss of unconsolidated subsidiaries applicable to parent company's investment for year December 31: 1936, $13,838; 1935, $32,513.

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MONOLITH PORTLAND MIDWEST CO., Laramie, Wyo., reports for the years ended December 31:

	1936	1935
Net sales	$820,173	$653,857
Cost of cement sold	388,576	323,324
Selling, administration and general expense	99,017	99,731
Depreciation and depletion	119,708	118,881
Operating profit	212,872	111,920
Margin of profit	25.95%	17.12%
Other income	5,981	1,535
Total income	218,853	113,455
Interest charges	10,796	19,865
Federal taxes	65,333	13,934
Special law suit expenses	60,113	.....
Net profit	82,611	79,656
Earned per share, preferred	$0.28	$0.27

Current assets as of December 31, 1936, were $335,095; current liabilities $110,543.

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NEW YORK TRAP ROCK CORP., New York City, reports for the year ended December 31, 1936, a net income of $168,397 after interest, federal income taxes, provision for doubtful accounts, $1,168 provision for federal surtax on undistributed profits, depreciation, depletion and minority interest, equivalent after annual dividend requirements on 7% no-par cumulative preferred stock outstanding at end of year to 50c a share on 179,890 no-par shares of common stock, excluding 110 treasury shares. This compares with net loss of $264,323 in 1935.

Current assets, as of December 31, 1936, including $345,611 cash, amounted to $1,673,324 and current liabilities excluding sinking fund payments on bonds and debentures, were $334,022 compared with cash of $307,822, current assets of $1,459,107 and current liabilities of $374,727 at end of 1935.

Total assets, as of December 31, 1936, were $16,693,912, comparing with $16,675,465 at end of preceding year, and profit and loss surplus was $3,962,321 against $3,961,250. Funded debt was $5,129,000, against $5,159,000.

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INDUSTRIAL SILICA CORP., Youngstown, Ohio, reports for the calendar year 1936 a net income of $169,631, compared with $25,804 in 1935.

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DIAMOND PORTLAND CEMENT CO., Middle Branch, Ohio, will soon have 30% of its stock owned by the public. Hitherto a closed corporation, 21,000 shares of its 72,000 shares of common stock are to be offered by two estates which have held 90% of the capital stock of the company. There is no funded debt or preferred stock. The company owns a cement plant with rated capacity of 931,000 bbl. per year and land amounting to 620 acres. Cash dividends have been paid continuously for 15 years. Recoverable limestone on the property is sufficient for 10,000,000 bbl. of cement. Dividends paid last year were $1.75 a share and net earnings $1.85 per share. Current assets March 31, 1937, were $267,191, including $128,424 cash. Current liabilities were $60,296 of which about $22,000 were tax accruals.

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MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, reports $714,215 operating profits on sales of $6,028,994 in the 1936 year. Depreciation charges ahead of such profit was $747,231. The net reported is after all taxes. This compares with net loss of $178,460 in the preceding year.

Production was 51% more than in 1935, according to President J. B. John. The company expended $224,082 in plant improvements and has appropriated $225,000 for improvements in the first half of 1937. Considerable new acreage has been acquired.

◇ ◇ ◇

BOSTON SAND AND GRAVEL CO., Boston, Mass., reports for the years ended December 31, consolidated income:

	1936	1935
Gross earnings	$880,151	$809,328
Operating expenses and taxes	821,864	753,772
Depreciation	65,582	69,690
Depletion	7,265	5,596
Operating loss	14,560	19,730
Interest	24,635	26,311
Net loss	39,195	46,041
Earned per share, common	(d)$2.02	(d)$2.15

Current assets as of December 31, 1936, were $309,078; current liabilities, $40,957.

LIME PRODUCERS' FORUM

Conducted by Victor J. Azbe, Contributing Editor, St. Louis, Mo.

LIME KILN HEAT BALANCE*

WE HEAR of lime kilns using as high as 9000 cu. ft. of natural gas per ton of lime, and of others using 5000 cu. ft.; and to create a gauge for comparison it would be quite desirable to know both what is the ideal consumption as well as what is practically possible under good operating conditions.

Of course much depends upon the kind of gas. Gas in some districts has a heat value considerably in excess of 1000 B.t.u. per cu. ft., while in others it may be less than this. Throughout this paper the basis is to be 1000 B.t.u. gas.

The lime also is a factor—what people call lime. In this case high calcium lime is to be the basis; with dolomite, gas consumption would be much less. Also lime is lime of at least 95 to 97% CaO; not something that contains up to 10% core, sometimes mistakenly termed lime.

These charts and calculations are based on natural gas, but along many lines they could be as well applied to other fuels. A thousand cubic feet of 1000 B.t.u. gas is 1,000,000 B.t.u.; and a million is a million whether the fuel is natural gas or West Virginia Pocahontas. The greatest difference that enters is due to the heat loss on account of water vapor. As natural gas has more hydrogen than solid fuels, and as this hydrogen burns to water, which escapes as vapor and not liquid, more heat of vaporization is carried to waste. Practically, however, this to a great extent is made up by the fact that fuels of high hydrogen content give lower CO_2 concentration, which in turn enables the stone to calcine a trifle easier; thus as far as heat is concerned bringing one up on the level with the other.

If all heat charged to the kiln were available for conversion of $CaCO_3$ to CaO, if none were lost by radiation, if lime were drawn cold, if combustion were complete, if the gases coming off the top were cold, if the vapor therein were condensed to a fog of liquid particles, then 2756 cu. ft. of gas would be used to produce one ton of CaO.

However, as mentioned before, not all of the heat in the gas is available. Some is lost because hydrogen burns to water. This loss will amount to about 100 B.t.u. per cu. ft. of gas or 10%.

As the kiln can in no way be blamed for its physical inability to utilize the latent heat, it seems that efficiency should preferably be based on the low rather than the high heat value. Then natural gas kiln efficiency would be comparable with mixed-feed kiln efficiency, burning coke that has practically no loss due to water vapor, having virtually no hydrogen. However, there must be a standard way of calculating efficiency, otherwise great confusion can be created. So regardless of the type of fuel, the high heat value should be used always with the difference taken into account in other ways, as by means of a heat balance.

No matter how much heat we have, limestone cannot possibly decompose to CaO and CO_2 unless this heat is applied at a temperature over 1525 deg. F. for 32% CO_2 atmosphere and 1648 deg. F. for 100% CO_2 atmosphere. The first condition prevails in the kiln and applies when the surface of the limestone begins to calcine; then later, when calcination is under the surface of lime, CO_2 concentration is 100%. The gas there is under pressure to escape, and as dissociation temperature varies with CO_2 tension, the necessary temperature to calcine the core must depend upon the density of the surface lime, its thickness and rate of calcination, but may readily be 2000 deg. F. or more. Generally speaking, however, 1525 deg. F. may be considered the minimum practical starting point for calcination of high calcium lime.

This 1525 deg. F. level is vital. All heat above can calcine calcium carbonate; all below can only dry the stone and preheat it. As there is always more than enough heat to preheat stone to 1525 deg. F., so the crux of the problem is how much heat is there above 1525 deg. F. This depends on the amount of air used and how high this air was preheated while coming up through the cooler.

The tabulation presented herewith on performance of the ideal kiln contains information built up by steps on what is the utmost under ideal conditions that a kiln could deliver. It will be noted that 3740 cu. ft. per ton of CaO is the theoretical limit if the cooler does its full possible share of work, but if the cooler does not revert the sensible heat in the lime, then gas consumption of an otherwise ideal kiln will be 6000 cu. ft. per ton. So the value of a well acting cooler is represented by a gas saving of 37.8%, even in the case of a perfect kiln.

This tabulation has other information of value; for one it develops the fact that if stone is dry, escaping gases will have an average temperature of over 500 deg. F. regardless of how high the kiln is. It shows that almost as much work is done in the cooler as in the preheating zone. The important items of this tabulation are gathered in a graphical presentation, on page 67, which emphasizes the importance of proper cooler action far beyond plain words.

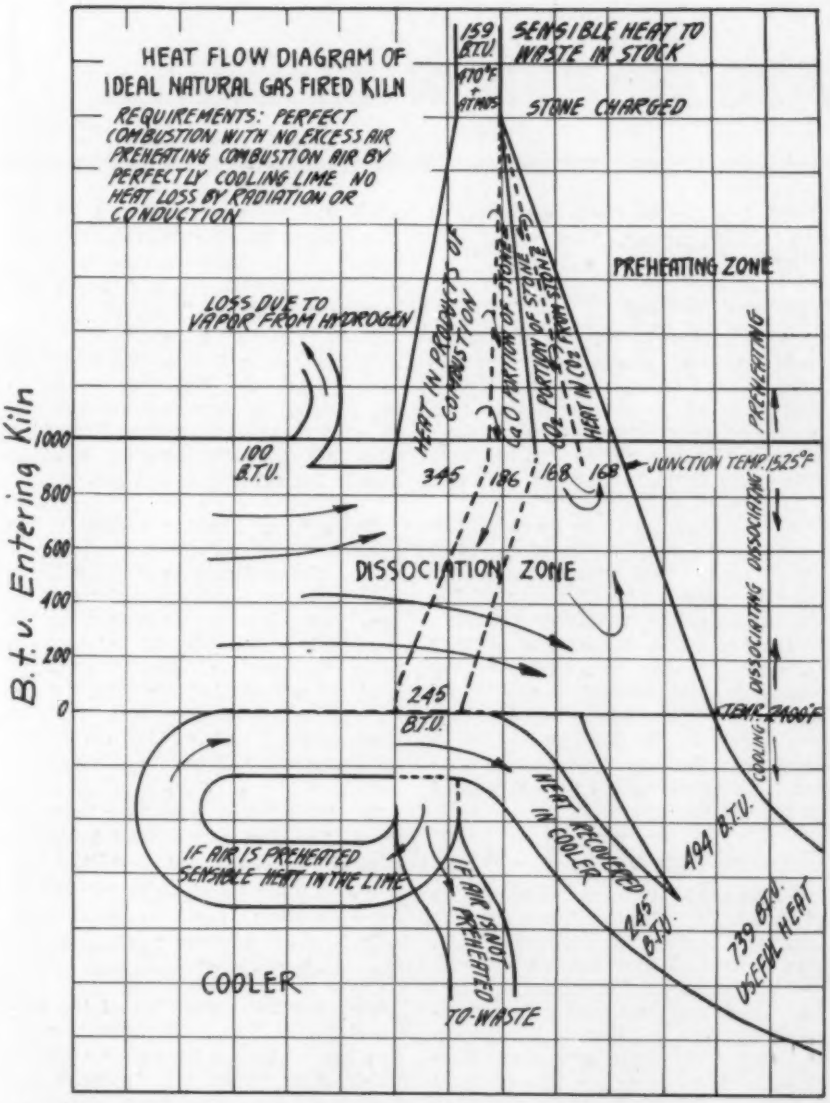
IDEAL LIME KILN PERFORMANCE

Per Thousand Gross Or Nine Hundred Net B. t. u.

Based on 1 cu. ft. of natural gas but appliable approximately to any fuel:

1. Gross heat in 1 cu. ft. of natural gas 1000 B.t.u.
2. Loss due to latent heat from combustion of hydrogen to H_2O (No. 1 — No. 2) 100 B.t.u.
3. Net sensible heat in 1 cu. ft. of natural gas, (No. 1-No. 2) 9000 B.t.u.
4. Weight of products of combustion, CO_2, 0.117, N, 0.567; H_2O, 0.096 0.78 lb.
5. Temperature at which calcination begins, CO_2=32%, 1525 deg. F.
6. Heat capacity of gases at temperature No. 5, CO_2, 400, N, 380, H_2O, 860. B.t.u./lb.
7. Heat escaping in products of combustion to preheating zone (No. 4 × No. 6) 345 B.t.u.
8. Heat remaining in dissociation zone (No. 3 —No. 7) 555 B.t.u.
9. Sensible heat in stone entering dissociation zone at temp. No. 5 per lb. CaO., 716 B.t.u.
10. Sensible heat in CaO portion of stone entering dissociation zone per lb. CaO., 350 B.t.u.
11. Sensible heat in CaO leaving dissociation zone at 2400 deg. F. per lb., 640 B.t.u.
12. Heat of high elevation carried to cooler by 1 lb. of CaO (No. 11-No.10) 290 B.t.u.
13. Heat necessary for dissociation to 1 lb. CaO., 1378 B.t.u.
14. Total heat in 1 lb. of CaO leaving dissociation zone (No. 10-No.12- No. 13) 2018 B.t.u.
15. Total heat of high elevation per lb. CaO leaving dissociation zone (No. 12-No. 13) 1668 B.t.u.
16. CaO produced per 1000 B.t.u. gross if air for combustion is not preheated, .332 lb.
17. Gas consumption per ton CaO under conditions No. 16, 6020 cu. ft.

* Part of a paper delivered at the 19th annual convention of the National Lime Association, Chicago, Ill., May 12, 1937.



18. Amount of heat available for dissociation if lime is fully cooled, 373 B.t.u.
19. CaO produced per 1000 B.t.u. gross if air for combustion is preheated and lime fully cooled, .535 lb.
20. Gas consumption per ton CaO under conditions No. 18 and No. 19, 3740 cu. ft.
21. Gas reduction in ideal kiln if lime preheats combustion air, 38.8%
22. Amount of stone passing down kiln under conditions No. 19, 0.955 lb.
23. Amount of CO_2 from stone escaping up the kiln (conditions No. 19) 0.42 lb.
24. Escaping CO_2 (No. 23) supplies heat to preheat CO_2 portion of downcoming rock
25. Heat for preheating CaO portion of rock is derived from heat in products of combustion
26. Amount of heat abstracted by heating CaO portion from products of combustion, 188 B.t.u.
27. Heat remaining in products of combustion (No. 26-No. 7) 157 B.t.u.
28. Gases escaping with no moisture from stone and no excess air—CO_2 0.537; N., 0.567; H_2O, 0.096 lb.
29. Heat capacity of gases per hundred degrees rise, 33.4 B.t.u.
30. Temperature of escaping gases No. 28, atmospheric temp., 470 deg. F.
31. Percent CO_2 by volume in gases escaping from ideal natural gas kiln, 37.5%

Install Hydrators

LIME & HYDRATES PLANTS CO., York, Penn., states that it has recently installed the Kuntz lime-hydrating system for the following companies: Limeton Lime Co., Limeton, Va.; New Enterprise Stone & Lime Co., Aschom, Penn.; Paul Lime Co., Douglas, Ariz. The Lime & Hydrates Plants Co. is installing a plant of its own to make a plastic hydrate of high calcium lime.

Shell Grinding

ALCO CORP., Myrtle Beach, S. C., has established a new plant for making agricultural liming material by grinding shells dredged nearby.

Sales Office

LEE LIME CO., Lee, Mass., has appointed Frank R. Loftus as its representative in the New York Metropolitan area, effective June 1. Mr. Loftus, who has been identified with the building industry a score of years, formerly was vice-president of the Blue Diamond Service Co. and special representative of the Lehigh Portland Cement Co. The New York office will be in the Architect's Building, 101 Park Ave.

Unfair Business Practice No. 1

OKLAHOMA legislators, threatening to appropriate money for a state cement plant, have been trying to browbeat P. R. Chamberlain, superintendent, Dewey Portland Cement Co., Dewey, Okla., and M. O. Matthews, superintendent, Oklahoma Portland Cement Co., into giving up their companies' cost data. Both companies' head offices are outside the state.

New Plant

HURST STONE CO., Maquoketa, Iowa, has opened up a new quarry and crushing plant, electrically equipped.

Sales Office

L. G. EVERIST, INC., Sioux Falls, S. D., has opened a sales office at 210 Paulton Block, where management and sales will be concentrated for the firm's Dell Rapids, S. D., quarry, the Hawarden, Ia., gravel plant, and the new Klondike, Ia., gravel plant, now under construction, and the Sioux Falls, and Canton, S. D., gravel plants. P. O. Pederson is in charge.

Union Agreement

LEHIGH PORTLAND CEMENT CO., Oglesby, Ill., plant, according to local reports, has signed an agreement with its union labor which includes the check-off, a week's vacation with pay, a 6-hr. day and a 6-day week, time and a half for all time over 40-hrs. per week, six holidays a year including New Year's, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas. The basic hourly wage was increased from 60c to 63½c per hour.

Business Coming

NEW YORK STATE cement plants in the Hudson River valley are contemplating a demand of at least 10,000,000 bbl. over the next few years because of the development of New York City's new Delaware river water supply, which includes construction of an 86-mile aqueduct. It is reported locally that LEHIGH PORTLAND CEMENT CO., may rehabilitate its old plant at Athens, south of Catskill, N. Y., which has not operated since the World War.

NATIONAL ASSOCIATION *Activities*

Sand and Gravel

SECRETARY AHEARN, of the National Sand and Gravel Association is busy these days keeping track of Supreme Court decisions, proposed new federal legislation and what not in the Washington stew. It is not known whether he spends any time checking up to see how good a prophet he was a year, or even a few months ago. But it looks as though V. P. has had at least a fair batting average.

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Labor Problems

Discussing the results of his investigation of labor conditions in the sand and gravel industry, Secretary Ahearn said recently:

"A questionnaire was sent to member companies, designed to develop detailed information regarding employer-employe relationships throughout the country. This questionnaire asked for advice as to wages and hours, as to the signature or non-signature of agreements with unions, as to experiences with boycotts or other forms of pressure, and as to a general statement of the employer's point of view towards recognition of unions. The data thus obtained were used in assisting individual member companies who were confronted by a specific labor question. Proposed agreements were sent to us for critical review, and suggested wage and hour rates were compared with the basis prevailing in other localities. The value of this service was quickly recognized and within recent months our organizations have found it necessary to devote a major part of their time to the handling of labor questions.

"Our experience offers conclusive evidence that particularly in those industries where collective bargaining has been the exception rather than the rule in the past, national trade associations must frankly recognize the importance of broadening their work to include labor relationships and must offer to their member companies a definite service in this field. While a summary of relevant Federal and State laws is a necessary first step, Association activity should not stop at this point, because the employer frequently finds himself in a position where the determination of his problem does not rest upon legal principles. He has a practical problem which must be met in a practical way, and he should be able to look to his Association for assistance in arriving at the correct answer."

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Directors' Meeting

The semi-annual meeting of the association's board of directors will be held June 24 and 25 at the Hotel Statler, Buffalo, N. Y. As usual this will be an open meeting and local active members of the association are invited to sit in. The program includes some golf and visits to local operations.

A meeting of the executive committee of the board was held in Washington, D. C., April 30, at which considerable time was devoted to discussion of the questionnaires on the labor situation, referred to above. Some slight changes were made in the constitution of the association with respect to election of directors; and F. P. Spratlen, Jr., Denver, Colo.; R. N. Coolidge, Nashville, Tenn., and Stephen Stepanian, Columbus, Ohio, were elected to membership on the board.

Crushed Stone

A MEETING of the executive committee of the National Crushed Stone Association was held in Washington, D. C., May 6, with all members present with the exception of one (from Texas). Aside from routine business it was decided that the association should soon undertake publication of a Manual on Uniform Cost Accounting. The material to be included is the result of work done by the accounting firm of Ernst and Ernst during the days of NRA. It has been revised to bring it up to date.

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Directors' Meeting

The semi-annual meeting of the board of directors of the association is scheduled for June 17 at the Greenbrier Hotel, White Sulphur Springs, W. Va. A considerable party is expected to stay over the week-end and play golf, etc. The association's past-presidents are confirmed addicts. One of them, A. L. Worthen, by the way, sometimes plays at the Farmington (Connecticut) Country Club, which is near one of his company's plants. Recently we came across the following item about this course:

"After a sad day on the links when you have highly resolved never to play again, (as Al does sometimes after a round with his friend Otho), you might reflect on the fact that, a few years ago when the pond was drained on the Farmington Country Club course, they found in addition to several thousand golf balls, seventeen clubs, three golf bags—but no golfers."

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Administrative Director Boyd recently attended an executive committee meeting of the Quarry Section of the National Safety Council in New York City. The annual Safety Congress is to be held in Kansas City in October.

• • •

Engineering Director Goldbeck has been appointed chairman of a sub-committee of the American Railway Engineering Association's committee on ballast. The committee on ballast met in Washington, D. C., May 17, to take steps to correlate service results of different kinds of railroad ballasts with the results of the Los Angeles rattler tests on these different ballasts. Mr. Goldbeck's sub-committee will handle this project.

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The following concerns have been admitted to active membership: York Hill Trap Rock Co.; L. Suzio Trap Rock Co.; and the Suzio Trap Rock Co., all of Meriden, Conn.

Ready-Mixed Concrete

The executive committee of the National Ready Mixed Concrete Association has adopted a new scale of dues, which it is hoped will "balance the budget" for the current year:

Yardage in 1936	Amount
0- 25,000 cu. yd.	$10.00
25,000- 50,000 cu. yd.	15.00
50,000-100,000 cu. yd.	25.00
100,000-150,000 cu. yd.	35.00
Over 150,000 cu. yd.	50.00

President Resigns

PORTLAND CEMENT ASSOCIATION, Chicago, Ill., announces the resignation on May 25 of Edward J. Mehren, president since 1931. Mr. Mehren desires to devote his whole time to his personal interests in Arizona, where he has extensive citrus fruit groves, and in the East where he has other business interests.

Rebuilding Office

SOUTHERN STATES PORTLAND CEMENT Co., Rockmart, Ga., is replacing its office building, which burned recently, with a $20,000 structure.

Ball Mill Repair Accident Cost a Life

READERS engaged in rock milling for most commercial purposes make use of ball mills and are frequently confronted with the necessity for replacing deflector or "breast" plates which, of necessity, are subjected to greater wear than most other parts of the mill. The fatal accident about to be described occurred in the raw milling department of a cement plant and resulted from the employment of methods that have been used rather generally without accident in the past.

The fatal mishap took place while a crew was at work replacing breast plates in a Gates ball mill. These plates, which are approximately 4 ft. 11 in. long, 30 in. wide and 2½ in. thick, weigh about 1100 lb. each. During installation, the mill was to be held in a stationary position by means of a large, especially constructed brake block held against the coupling between the motor and the mill by a 25-ton jack. Three plates could be installed at one position of the mill.

In this particular case these plates were lowered into approximate position with slings and then held with pinch bars while the slings were removed. Sledging and pinching are required to force the plates into final position for bolting. Three plates had been placed at one setting of the mill and the latter had been turned to admit additional plates. Then the jack had been set, as a brake, by one of the riggers and checked by one of the skilled mechanics. Five men were engaged on the job: an assistant master mechanic, two mechanical leaders, and two riggers. The general arrangement of the work is well indicated in sketch No. 1.

The fourth plate was lowered to within 4 in. of the final position and as the second pinch bar was removed the plate dropped vertically into the slot. The impact jarred the mill sufficiently to kick both brake block and jack out of place. Then the unbalanced weight of the four plates on one side of the mill caused it to roll quickly.

The plank on which the workmen stood (within the mill) rested on the main shaft of the mill and on the south side of the mill casing. When the mill rolled, taking down the north side, the first plate coming up on the south side hit the plank. An experienced rigger, who had been standing on the plank inside the mill helping to work the plate into position, was thrown off and landed in the north side of the hopper.

When the fourth plate, as yet unbolted, passed under the center of the mill, it slipped out about 13 inches and when the motion of the mill reversed, the rigger was crushed by projecting plates. Death followed immediately. The rigger was a man of 11 years' service, known to be careful and competent, and responsibility for the accident cannot be placed on him.

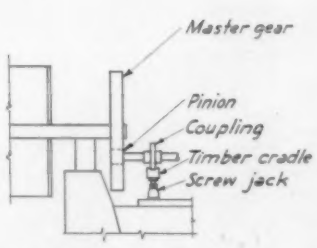
Methods Faulty

It interests us to know that this accident took place in a plant which has had an outstanding safety record. The management is progressive and safety-minded and would not knowingly permit any kind of a safety hazard to exist. The accident occurred because a common practice had come to be accepted as safe, although now recognized as in error. The most important of all the lessons which this tragedy teaches is that every possibility for failure in any plan or device *must be uncovered.*

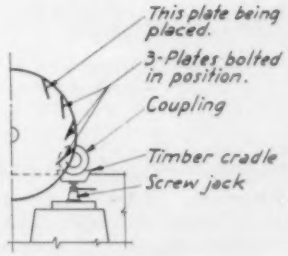
The true test of safety is not whether a plan will work safely once or many times. The real test must determine if a failure is possible under any circumstances. The fact that the brake and jack method had been in use for a long time did not prove that it is safe, but this one fatal accident proves conclusively that it is unsafe. The fundamental error was in placing too much confidence in the brake block.

One rather unusual circumstance in

Sketch No. 1

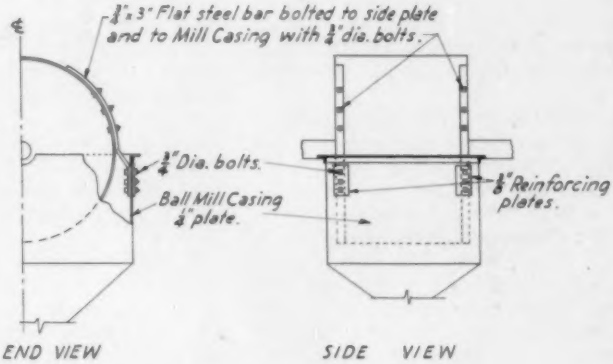


SHOWING METHOD OF HOLDING MILL IN POSITION



POSITION OF PLATES AT TIME OF ACCIDENT

Sketch No. 2 CLAMP METHOD OF HOLDING MILL



END VIEW SIDE VIEW

respect to this accident deserves attention. At some time prior to the accident the brake block and jack in regular use at the plant for this purpose was tested and found to brake the mill satisfactorily. But in connection with the present rebuilding of the mills it was considered desirable to rig up a second brake block and jack. Being identical with first outfit the second was considered safe. But it was the duplicate block that failed to brake the mill in this case. After the accident it was established by trial that the original block performed safely and the duplicate again failed. It was evident that they were *not* identical, an erroneous assumption which had a very direct bearing on the accident.

Reference to sketch No. 2 will indicate the new rig that is recommended to take the place of the original method, for it is obvious that the friction brake method is faulty and should no longer be used.

Safe Method

Remember: It is not safe to assume that present method of doing a job is the safest until:

(*a*) Every possible alternative method and procedure has been carefully compared, analyzed and studied.

(*b*) The chosen method has been given every test and each step in the procedure has been checked until you are convinced that the maximum physical protection will be provided and that there will be a minimum of personal exposure to danger in the event something "goes wrong".

Planning for safety on the job just described went no further than provision for block brake and jack *because* this was believed *on the basis of past performance* to insure against movement of the mill.

Proper planning would:

(*a*) Allow for the possibility of the block giving way and the mill moving.

(*b*) Either set up the work so man would not be inside the mill or, *if this were not possible*, would do everything possible to protect man against falling. Perhaps a safety belt, suspended from above, would have saved this victim.

It is suggested that this article be not filed until all repairmen, riggers and others in your organization who might be concerned with such an accident as this have reviewed the circumstances of this fatality and made sure that similar jobs with which they may be connected are double checked for safety.

• Reported •

By Geo. D. Roalfe

Los Angeles

WEST COAST ACTIVITIES

Business Outlook

(The first part of this article was published in Rock Products, *May, 1937, page 83.)*

Heavy Engineering Construction

Highway and bridge construction in these three states is of such importance as to require special treatment and is, therefore, not included in this classification. In this category, the Grand Coulee dam being constructed across the Columbia River in the state of Washington easily ranks first. Present plans call for a heavy pouring schedule during the coming summer months on this 3,600,000-cu. yd. concrete job. One of its most interesting features is the aggregate plant constructed by the contractors, described in detail by Edmund Shaw, Rock Products, March, 1936, providing 1000 tons of finished aggregate per hour.

As was expected, the department of lighting, the municipal system of the City of Seattle, called for bids on the initial unit of the Ruby Dam before the first of May. This is the largest unit in the Department's plan for developments on the Skagit River. The Ruby Dam is the farthest upstream development proposed. When completed it will call for the use of 2,200,000 cu. yd. of concrete in its construction and will be 635 ft. high. The present program provides for the construction of relatively small sliver of the final dam requiring only some 260,000 cu. yd. of concrete.

The specifications and plans call for a heavy arch type of construction similar to the Boulder Dam. Cement specified is of the modified low temperature variety and similar to that being used at the Grand Coulee dam. Aggregates in general are from 6-in. maximum diameter and the suggested sources are local deposits in the stream bed about two miles upstream. The principal mixes have a cement duty from 1.3 to 1.5 barrels of cement per cu. yd. of concrete. Water-cement ratios are specified between the limits of 0.5 to 0.6. This work is being financed under a PWA grant of $300,000 together with department funds bringing the available total to $7,185,000. Present estimates allow $4,800,000 for the dam proper, the remainder to be used in the construction of new power and transmission facilities. This project can be said to be under way as the site is being cleared under contract.

Bonneville Dam across the Columbia River, approximately forty miles upstream from Portland, Oregon, is in its final stages. No further activity in this field is in immediate prospect in this state.

In California there are a number of projects under construction and in the preliminary stages. The Central Valley Project, which is designed to redistribute the water resources of the San Joaquin and Sacramento Valleys is being actively pushed. The major structures at present proposed are the Kennett dam, across the Sacramento river in northern California and the Friant dam in central California east of the city of Fresno. This project is being administered by the U. S. Bureau of Reclamation. Plans and specifications are being prepared for the Friant dam in its Denver office and current reports are that bids will be invited before the expiration of this year. The Kennett dam plans are still in the preliminary stage. Of these two structures the Kennett dam is by far the larger. Incidental work in this program will include extensive canal and control systems. The Los Angeles water department, whose practice is to conduct their construction work with their own forces, is engaged in the construction of two hydraulic-fill dams known as the Grant Lake and Long Valley dams. These are located in east central California, work being pursued only in the summer due to the heavy weather condition encountered in the Sierras in winter. They are also driving the Mono Craters tunnel and expect shortly to begin construction of concrete lined conduits from Leevining creek to Grant Lake and from Grant Lake to the west portal of the Mono Craters tunnel. These works serve as additional developments of the Los Angeles water supply from Owens Valley.

Work is continuing on a large scale in the construction of the Colorado River aqueduct being built by the Metropolitan Water District of southern California. The district is still experiencing con-

siderable water difficulty with the San Jacinto tunnel.

Parker dam across the Colorado river below its junction with the Bill Williams river is rapidly approaching the heavy concreting stage. In the extreme south portion of the state work is progressing on the Imperial dam, also across the Colorado river. This structure is a portion of the All-American Canal system designed to provide the Imperial and Coachilla valleys a more extensive water supply. Concrete work on both the Arizona and California ends is virtually complete. The central portion will be under way during this year. The Flood Control District of Los Angeles County has just invited bids on concrete waste way for the San Gabriel Dam, the principal distinction of which is the claim that it is the largest rock fill dam ever constructed. Incidental works for the same authority utilizing cement and aggregates are expected to run into large figures during the next year.

Building

The building industry is definitely becoming more active in the entire coast area. The improvement is undoubtedly greater in southern California than elsewhere. At first glance this appears as a bullish influence, but a study of available figures indicates that this increase is most largely made up of small and medium size residential buildings. While it is true that this type of activity does produce cement and aggregate business, this type of construction uses relatively small amounts of these commodities per unit. Commercial and industrial building is still definitely slow. Southern California in particular has just about completed the current government-aid school reconstruction program. Legislation passed by the state as well as numerous cities requires that construction standards for schools and other public building be definitely raised. All are required to have definite resistance to horizontal stresses such as occasioned by earthquakes. It is not intended to infer that because the present program is drawing to a close that all or even a major part of the structure needing attention under these laws have been rehabilitated. The potential business in completing such rehabilitation defies present estimation as to amount, but would most certainly run into large figures. In common with other sections of the country the amount of such construction during the past ten years in the west has not been sufficient to offset depreciation let alone care for any demand for additional facilities due to population growth. Such large projects as are under way on the coast at this time are very largely the result of public financing.

Concrete Houses

In an effort to stimulate the use of concrete in residential construction the Portland Cement Association is doing some very effective work. In their Los Angeles office, Chas. Wailes, Jr., a structural engineer, has done much interesting work in this field. There are now some fifty concrete houses under construction in the Los Angeles area. In these gunite, preformed units of various types, and monolithic hollow and solid wall types are represented. As the result of this activity many builders are gaining an accurate estimate of the various types of construction.

Several commercial aggregate producers are developing preformed units with both light weight and standard aggregates. Pacific Coast Aggregates, Inc., is preparing to market a unit made from standard aggregates and the Basalt Rock Co. is distributing a lightweight unit through John Cassaretto, San Francisco. The Concrete Pipe Co., Seattle, and the Jourdan Concrete Pipe Co., Fresno are now supplying a growing trade.

Special Aggregates

Interest in special aggregate is definitely increasing. Some impetus to this was undoubtedly due to the use of "Gravellite" in the decks of San Francisco-Oakland Bay Bridge. Gravellite is an artificial aggregate made by burning clay. Similar products variously named have been used in the construction of a high school building in Fullerton, Calif., and in pouring a roof slab for a telephone building in the environs of Los Angeles. In the school building it was chosen because of the poor foundation character of the soil at the site.

Natural lightweight aggregates are receiving major attention in precast units. One operator is making studies on a natural trap rock with specific gravity of less than 2.25. Tests that have not been made public indicate that it will stand the Los Angeles rattler tests with smaller losses than aggregates now being marketed. Its concrete making properties as measured by crushing tests on cylinders are very satisfactory.

Despite the rather heavy winter all cement producers interviewed reported unexpectedly satisfactory stock movements. It seemed to be the consensus of opinion that the future prospects were becoming increasingly favorable. Some expect periodic breathing spells. The aggregate producers were not as a whole optimistic. Available capacity for production in all areas is considerably in excess of the market. Many of the larger works which furnished business for the cement producers were so located that it made purchase of aggregates from commercial producers impossible.

Sand-Lime Brick Size Revision

THE STANDING COMMITTEE in charge of Simplified Practice Recommendation R38, Sand-Lime Brick, has approved a revision of the recommendation, and the Division of Simplified Practice of the National Bureau of Standards has mailed copies to all interests for consideration and approval.

The original recommendation, which became effective July 1, 1925, provides for one standard size of sand-lime brick, having a length of 8 in., width of 3¾ in. and thickness of 2¼ in. The recommendation was reaffirmed without change in 1926, 1928, and 1933.

The current revision provides for the addition of a tolerance of ¼ in. on length, and ⅛ in. on thickness and width, without any change in the standard size.

Mimeographed copies of the proposed revision may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

Sand-Lime Brick Production and Shipments

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States. They may be considered representative of the industry.

Ten active sand-lime brick plants reported for the month of April, this number being one less than that reporting for the month of March, statistics for which were published in May.

Average Prices for April

Shipping Point	Plant Price	Delivered Price
Milwaukee, Wis.	$10.00	$12.50
Pontiac, Mich.	12.50	15.00
Grand Rapids, Mich.	11.50	....
Detroit, Mich.	....	16.00
Mishawaka, Ind.	9.35	....
Syracuse, N. Y.	14.00	16.00-20.00
Saginaw, Mich.	10.80	....
Watertown, Mass.	12.50	13.50

Statistics for March and April

	March†	April*
Production	4,041,520	3,062,785
Shipments (rail)	148,200	226,000
Shipments (truck)	2,972,255	2,993,070
Stock on hand	4,068,122	4,682,452
Unfilled orders	5,700,000	3,710,000

† Eleven plants reporting; incomplete, two not reporting unfilled orders.

* Ten plants reporting; incomplete, three not reporting unfilled orders.

Sand Lime Brick Used

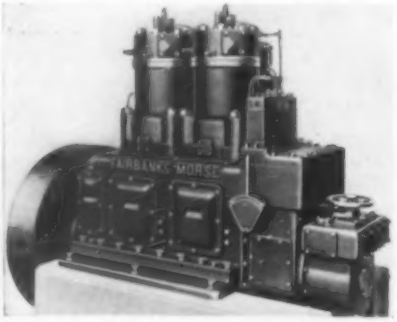
THE PARAGON PLASTER CO., Syracuse, N. Y., is supplying sand-lime brick for the Pure Foods Building, New York State Fair Grounds.

ATLANTIC BRICK CO., Watertown, Mass., is furnishing sand-lime brick for building of a plant of Continental Can Co. at Malden, Mass.

New MACHINERY & EQUIPMENT

Heavy Duty Diesel

FAIRBANKS, MORSE & Co., Chicago, Ill., have developed the Model 42-E Diesel engine to meet the demand of small power users for a heavy-duty, continuous service, stationary engine. It is made in two- and three-cylinder combinations with ratings of 60 and 90-hp. at 450 r.p.m. It has an 8¾-in. bore and a 10½-in stroke, direct airless injection of fuel, is of two-cycle type with crank case scavenging.



Two-cycle, two-cylinder Diesel engine for heavy duty

Welding Shield

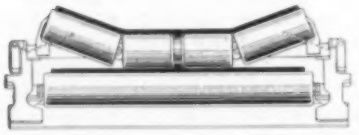
WILLSON PRODUCTS, INC., Reading, Penn., has produced a welding helmet of new design. Formed of one-piece black vulcanized fibre and cut deeply to offer side protection to a point well back of the ears, the new helmet is said to have greater ruggedness to withstand hard shop use. The usual riveted, lapped-over seams or joints are eliminated; a smooth, rounded interior promotes air circulation and results in a well ventilated, cool, comfortable helmet. A 2 x 4¼-in. Willson-Weld glass is standard in the new helmets.

Welding helmet of one-piece vulcanized fibre

Center-Guide Conveyor

LINK-BELT Co., Chicago, Ill., announces a center-guide belt conveyor which consists of a conveyor belt molded with a continuous central guide strip on the under side, and the use of anti-friction idlers having a central roll with a deep

Self-guiding belt conveyor

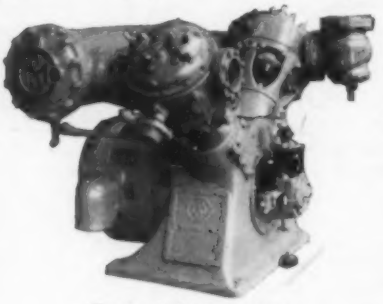


Belt showing central guide

groove within which the guide strip is confined in both runs. Furnished in any width, there are two guides for extra wide belts. It is called the "Philips Brand" after the Link-Belt engineer who invented it.

Compressors—Drill Sharpener

SULLIVAN MACHINERY Co., Michigan City, Ind., has announced a new type industrial air compressor-class WN-112. It is a heavy duty machine in sizes of 378, 480, 642 and 800 cu. ft. per min. capacity. Equipped with a built-in motor it requires only a floor space 6 x 8 ft.



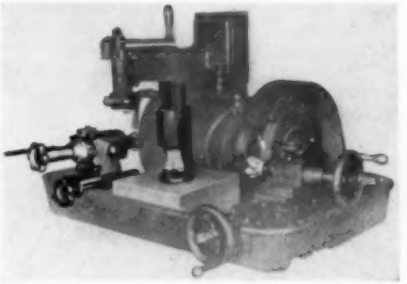
Compact air compressor

Drill-Bit Sharpener

The same company also announces a new detachable bit grinding attachment for use on the various types of detachable bit grinders now on the market.

The Sullivan detachable bit with the unusual design of broad chopping or reaming edges and single cutting edge necessitates a different grinding method from that used on the conventional detachable bit.

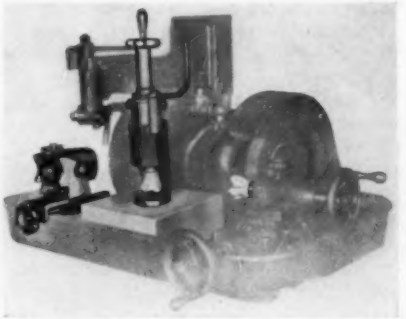
The new attachment consists of a



Drill-bit grinder attachment with bit inserted horizontally

holder for loading, a barrel with an expansion collet for gripping the bit, and a rocking sleeve mounted on an adjustable base.

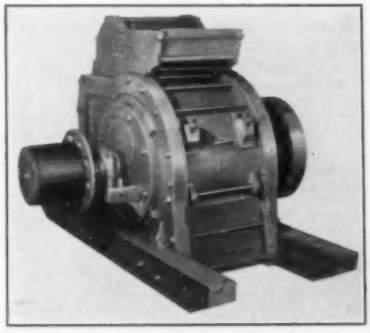
Alignment is secured by the cutting edges of bit resting between two bars of the loading fixture and bit holder inserted in the loading casing. The alignment is automatic as the expansion col-



Grinder attachment with bit inserted vertically

let tightens to grip the bit the holder slips into alignment stops. The holder is then inserted into the rocking sleeve with rocker rolls contacting the radial cams while a dowel pin fits into groove on the sleeve to insure true grinding. A rocking of the holder grinds the reaming edge and one side of the cutting edge. The rocker rolls contact the radial

cams during the entire grinding operation so that the bit is in proper contact with the grinding wheel to produce a straight cutting edge. The holder is then revolved one hundred eighty degrees and the same simple operation is repeated and the bit is ground. The gauge is ground by the same method as utilized on the various types of machines.



Swing-hammer pulverizer

Pulverizer

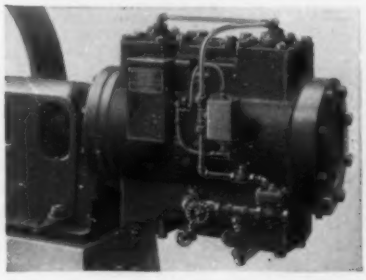
DAY PULVERIZER CO., Knoxville, Tenn., has placed on the market a pulverizer or swing-hammer crusher with a feed opening 12 x 21-in. and a rated capacity of 15 to 30 tons per hour of ground agricultural limestone. It has SKF double-roll, self-aligning roller bearings, manganese-steel hammers and high carbon tool steel grate bars, adjustable. On skids it weighs 10,000 lb.

Refractory-Shooting Gun

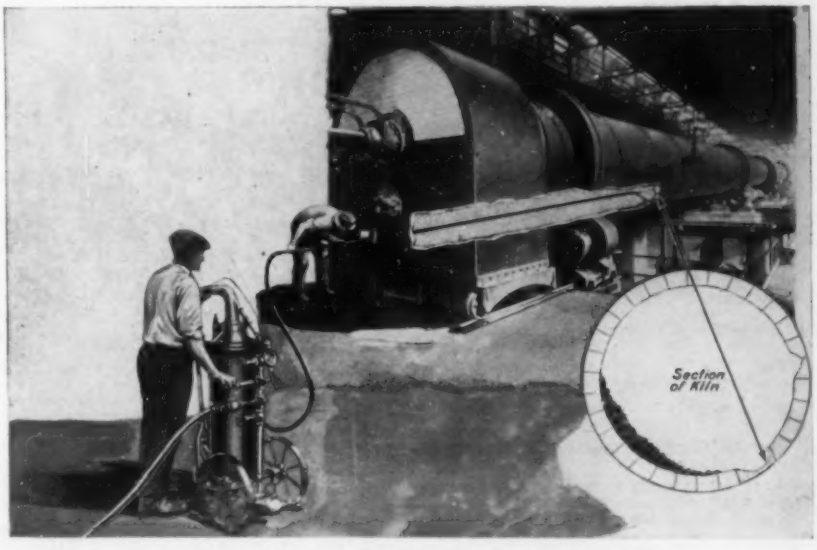
QUIGLEY CO., New York City, has on the market a "refractory gun" for repairing the linings of rotary kilns by shooting a refractory cement mixture into the bad spots by compressed air. It is said that because of the force of application, the mixture will stick to hot or cold surfaces where troweled applications fail to hold. It is claimed hot spots in rotary kilns can be patched without shutting down the kiln by the use of extension spray nozzles. A number of cement plants are already using the device.

Automatic Compressor Control

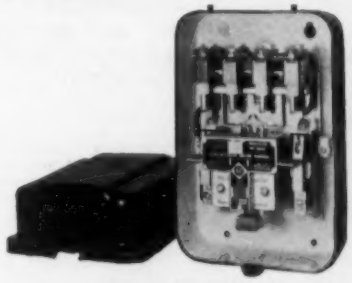
WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J., has developed an automatic start-and-stop control, combined with automatic loading and unloading for motor-driven, single-horizontal compressors. This device operates on standard electric equipment and can be installed wherever a conventional automatic starter is used for controlling the compressor motor. The only other provision necessary is a pressure switch to operate a pilot circuit. The pressure switch control is transferred electrically from the motor starter to the magnetic unloader, and either position may be selected at will. If connected to the motor starter, the compressor starts and stops on the demand for air. When connected to the magnetic unloader, the compressor runs continuously and simply loads and unloads, depending upon whether or not air is needed. If desired, the cooling water supply can also be automatically controlled.



Magnetic unloader for air compressor



Refractory shooting gun for making patches in rotary kilns



New motor starter

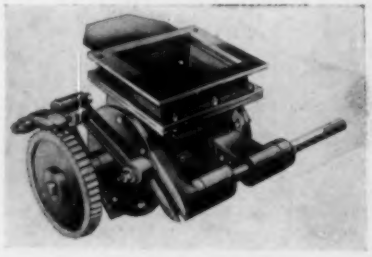
Motor Starter

ALLIS-CHALMERS MANUFACTURING CO., Condit Works, Boston, Mass., announces a new type of cross-the-line air motor-starter, equipped with "Ruptors", known as type AP-7. The "Ruptors" are enclosing chambers which confine and depotentiate the arc formed by circuit interruption. These "arc-depotentiating chambers" greatly increase the interrupting ability of the contacts, and form an isolating barrier between contacts of opposite polarity.

It is made for 7½ and 5-hp. motors at 440 and 550 volts, and 3-hp. at 110 volts.

Feed Roll

ARNOLD & WEIGEL, INC., Woodville, Ohio, has developed a small feeding mechanism adaptable for feeding small size materials from bins and hoppers. The feeding is done by a spiral rotor of special design. It is made in three sizes, covering a wide range of feeding rates. The entire device is enclosed in a dust-proof, cast-iron housing. Material can pass through the feeder only when it is operating.



Feed roll device

Back in Lime Business

ARNOLD & SON, Woodville, Ohio, comprised of Valentine Arnold and his son, Charles Arnold, have entered the lime-plant design and construction field. Mr. Arnold, Sr., was a former partner in the firm of Arnold & Weigel.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of May 22:

New England

41569. **Crushed or broken stone** (See Note 3), Winchester to Clinton, Mass. Proposed—60c per net ton. Reason—To enable the B. & M. R. R. to receive a haul on this material.

Trunk

Sup. 4 to 35689. **Talc tailings and soapstone**, ground or pulverized, C. L., minimum wt. 70,000 lb., from Conowingo, Md., to Denver, Colo., 61c per 100 lb.

Sup. 1 to 35756. **Moulding sand**, C. L. (See Note 2), to Arvida, Que., $6.40 per net ton, from Rhinecliff, Germantown, Rensselaer, Albany, Try, Green Island, Cohoes, Crescent, Niskayuna, Aqueduct, West Albany, Karner, Schenectady, Alsen, Coxsackie, Selkirk, Wemple, Glenmont, Fullers and So. Schenectady, N. Y.

35760. **Rock, ganister**, not ground, C. L., (See Note 2), from Three Springs, Penn., to Alexandria, Penn., $1.10 per net ton.

35762. **Limestone**, crushed or broken, C. L., minimum weight 60,000 lb., from Lebanon Valley stations, viz.: Annville, Avon, Lebanon, Myerstown, Palmyra and Swatara, Penn., to Framingham, Mass., $3.20 per net ton.

35763. **Slag** with no metal content, C. L. (See Note 2), from Perth Amboy, N. J., to Newark, N. J., 70c per net ton. Based on Buckland slag scale.

35764. To cancel all rates on **sand and gravel**, in open top cars, and on sand (except industrial) in open top cars from Natrona, Penn., to points named on the Pennsylvania, Baltimore and Ohio, Bellefonte Central, Bessemer and Lake Erie, Huntingdon and Broad Top Mountain, Monongahela, Montour, New York Central, Pittsburgh and Lake Erie, Pittsburgh and Shawmut, Pittsburgh and West Virginia, Pittsburgh, Chartiers and Youghiogheny and Western Allegheny railroads, as published in P. R. R. I. C. C. 1446.

35769. **Limestone**, ground or pulverized, in straight or mixed carloads, minimum weight 60,000 lb., from West Apollo, Penn., to Apollo and Vandergrift, Penn., 60c; Salina, Avonmore and Hyde Park, Penn., 65; Saltsburg, Penn., 70; Leechburg, Penn., 75c and Indiana, Penn., $1 per net ton.

35772. **Crushed stone** and screenings, in straight or mixed carloads (See Note 2), from Birdsboro, Penn., to Defiance, Ohio, 23½c per 100 lb.

35793. **Slate**, crushed, ground, refuse or scrap, C. L. (See Note 2), from Whiteford, Cardiff, Md., Delta and Slate Hill, Penn., to Montreal, Que., 26c per 100 lb.

35810. **Limestone**, unburnt, ground or pulverized, and stone dust, C. L., min. wt. 60,000 lb., from Natural Bridge, N. Y., to various points in New York state on Erie R. R., N. Y. C. R. R., P. R. R. and Nickel Plate Road, rates ranging from $2.15 to $2.35 per net ton. Based on I. C. C. Docket 25220 scale.

35811. **Limestone**, ground or pulverized, in straight or mixed carloads, min. wt. 60,000 lb., from West Apollo, Penn., to Shelocta, Penn., $1.25 per net ton. Based on I. C. C. Docket 23068 scale.

35812. **Slag**, C. L. (See Note 2), from Sheridan, Penn., to Riddlesburg, Penn., $1.60 per net ton. Reason—Based on the Lycoming scale for a two line haul.

35814. **Sand** (other than ground, pulverized or naturally bonded molding), in open top cars without tarpaulin, C. L., from Succasunna, N. J., to Nazareth and Wind Gap, Penn., 90c per net ton.

35819. **Stone**, broken or crushed, C. L., and stone, crushed, coated with oil, tar or asphaltum, C. L. (See Note 2), from various points in New York state on the D. & H. A. R. to Cobleskill, Schoharie and Schoharie Jct., N. Y., rates ranging from $1.20 to $1.90 per net ton. Reason: Based on the Lycoming scale.

35820. **Slag**, ground or pulverized, in bulk in barrels, bags or boxes, C. L., minimum weight 50,000 lb., from Donora, Penn., to Trunk Line and C. F. A. territories, 60% of 6th class to be published by Exceptions to Official Classification.

35823. **Limestone**, ground or pulverized, C. L., minimum weight 60,000 lb., from Jamesville, N. Y., to Schoharie, N. Y., $1.95 per net ton.

35824. **Crushed stone and screenings** in straight or mixed carloads (will not include agricultural limestone or ground limestone, unburnt; fluxing stone or firestone; or stone, coated with oil, tar or asphaltum) (See Note 2), from Monocacy, Penn., to Tasley, Va., $1.60 per net ton.

35854. **Sand and gravel** (other than ground or pulverized or naturally bonded molding sand), in open top cars, without tarpaulin, C. L. (See Note 2), from Pittsburgh and Kenny Yard (Munhall), Penn., to Rambo, Penn., $2.40 per net ton. Based on I. C. C. Docket 22907 scale.

35869. **Sand and gravel** (other than ground or pulverized or naturally bonded molding), in open top cars, without tarpaulin, C. L. (See Note 2), from Vandalia, N. Y., to Alfred, N. Y., 90c per net ton. Based on I. C. C. Docket 22907 scale.

35871. To revise rates on **stone, natural** (other than bituminous, asphalt rock), without coating of oil, tar or asphaltum, C. L. (See Note 2), from Jamesville, N. Y., to points in Trunk Line territory.

Central

50454. To establish on: (a) **Sand**, naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L.; (c) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L.; (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively. From Ottawa, Ill., district to Harriet, N. Y., (a) 320c, (b) 352c and (c) 320c per net ton., viz. Chicago or Kankakee, Ill., N. Y. C. R. R.

50456. To cancel various rates on **dolomite**, from Kenova, W. Va., to Maryland, Penn., Kentucky, Virginia Trunk Line and New England base points. Illinois, Indiana, Michigan, Ohio, Pennsylvania, New York and West Virginia. Classification basis to apply.

50470. To establish on **sand** (except industrial) and **gravel**, in open top cars, C. L., (See Note 3), to Hartsdale, Ind., from Elkhart, 75c and Mishawaka, Ind., 70c per net ton.

50489. To establish rates on **crushed stone**, in bulk; **crushed stone screenings**, in bulk; **agricultural limestone**, unburned (not ground or pulverized), in bulk; in open top cars only, C. L., from Bluffton, Ind., to points in Michigan, rates ranging from 120 to 144c per net ton.

50490. To establish on (a) **Sand** (a) and (c) as described in 50454 C. L., (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Portland, N. Y., to points in Pennsylvania and New York, various rates ranging from 90 to 200c per net ton.

50496. To cancel rates on **fluorspar** (crushed, ground or lump), in bulk or barrels, C. L., min. wt. 40,000 lb., from Cincinnati, Ohio, to points in Ohio, Pennsylvania and West Virginia as published in Items 790-A through 798-A, B. & O. R. R. Tariff H-3454-G, and tariffs of other Cincinnati lines. Class rates to apply.

50520. To establish on **limestone**, unburnt, and agricultural, in bulk or in bags, in box cars, C. L., min. wt. 60,000 lb., from Sibley, Mich., to Toledo, Ohio, 95c per net ton.

50537. To establish on **roofing granules**, C. L., min. wt. 60,000 lb., from Phalanx, Ohio, to St. Matthews, Ky., 260c per net ton.

50538. To establish on **stone**, rip rap and rubble, C. L., from Thrifton, Ohio, to Chevlot, Ohio, 139c per net ton.

50551. To establish on **limestone**, ground or pulverized, unburnt, C. L., min. wt. 60,000 lb., from St. Louis, Mo., to points in Ohio, Michigan, Indiana and Louisville, Ky., various rates such as Akron, 315c; Detroit, 295c; Elkhart, 235c; Louisville, 215c.

50554. To establish on (a) sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment; (b) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L. (See Note 3), but not for closed and open top cars of less marked capacity than 60,000 lb. and 80,000 lb., respectively, from Rosford, Ohio, to Milans, Mich., (a) 100c and (b) 75c per net ton.

50556. To establish on **sand**, as described in 50454, C. L.; from Brazil, Ind., Group to Hubbard, Ohio, (a) 270c; (b) 297c and (c) 270c per net ton.

50562. To establish on **stone**, crushed, **gravel and slag**, coated or treated with oil, tar or asphaltum*, min. wt., from Louisville, Ky., to Indianapolis, Ind., 153c per net ton.

50719. To establish on **crushed stone**, C. L., from Keeport, Ind., to West Lebannon, Ind., 70c per net ton.

50735. To establish on **sand** (except industrial) and gravel, C. L., (See Note 3), from LaFayette, Ind., to Boyleston, Hillisburg, Circleville, Michigantown, Avery, 45c; Jefferson, 40c; Forest, Ind., 45c; from Dundee, Ind., to Frankfort, 50c; Boyleston, Hillisburg, Circleville, 45c; Michigantown, Jefferson, Forest, 50c; Goldsmith, Kempton, 45c; Jacksons and Sharpsville, Ind., 40c per net ton.

50734. To cancel Items 1410, 1412 and 1416 of C. F. A. L. Tariff 400-N, publishing rates on **dolomite**, roasted, from Granite City, Ill., to points in Pennsylvania, Kentucky, New York, Ohio, Michigan, Indiana and West Virginia. Classification basis to apply.

50741. To establish on **sand** (except industrial), and **gravel**, in open top cars, C. L., from Perrysville, Ohio, to Big Prairie, 40c; Shreve, 50c; Orrville, 60c; Mansfield, 40c; New Washington and Robinson, Ohio, 60c per net ton.

50742. To establish on **sand** (except industrial) and **gravel**, in open top cars, from

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Negley, Ohio, (P. L. & W. R. R.) to Toronto, Ohio, 100c per net ton.

50743. To establish on **slag**, ground or pulverized in bulk in barrels, bags or boxes, C. L., minimum weight 50,000 lb., from Donora, Penn., to T. L. A. Trunk Line Arbitrary and C. F. A. territories, 60% of 6th class.

50756. To cancel Item 13180 of C. F. A. L. Tariff 218-J, publishing rate of $6.64 per net ton on **oyster shells**, not crushed nor ground, C. L., min. wt. 40,000 lb., from stations on the N. & W. Ry., viz.: Ceredo, W. Va., to Portsmouth, Ohio., Book, Ohio, to Cincinnati, Ohio, to Norfolk, Va. Classification basis to apply.

50772. To establish on **crushed stone** and **stone screenings**, also on agricultural limestone, C. L., from Huntington, Ind., to points in Michigan rates ranging from 105 to 153c per net ton.

50793. To establish on **limestone**, agricultural (not ground or pulverized), in bulk in open top cars, C. L., from Chicago, Ill., Joliet, Ill., and other points named on page 5 of C. F. A. Tariff 197-P to destinations in Indiana and Michigan, the same rates as are currently applicable on crushed stone.

50809. To establish on **stone, crushed, slag and gravel**, coated with oil, tar or asphaltum*, in open top equipment, in straight or mixed carloads, from Muskegon, Mich., to points in Michigan:

Ann Arbor	$1.88	Kalamazoo	1.42
Adrian	2.11	Lansing	1.53
Battle Creek	1.53	Marshall	1.76
Bay City	1.88	Owosso	1.53
Big Rapids	1.30	Port Huron	2.11
Coldwater	1.76	Saginaw	1.88
Detroit	1.99	Sturgis	1.53
Flint	1.76	Three Rivers	1.53
Grand Rapids	1.07	Wayne	1.99
Hillsdale	1.88	White Pigeon	1.76
Jackson	1.76	Ypsilanti	1.99

50823. To establish on **sand**, C. L., from Rockport, Ind., to Evansville, Ind. (when destined to points south of the Ohio and east of the Mississippi River, 30c per net ton.

50827 and 50888. To establish on **sand** (except industrial), and **gravel**, in open top cars, C. L. (See Note 3), from Elkhart, Ind., to Knox, Ind., and St. John, Ind., 75c per net ton.

Southern

14315. **Crushed stone**, C. L. Establish 125c net ton, Columbia, S. C., to Brunswick, Ga. Water competitive. Expires December 31, 1937.

14318. **Sand and gravel**, C. L. Establish 151c net ton, Petersburg, Ellerslie and Waremore, Va., to Glen Lyn, Narrows, Ripplemead, Pembroke and Merrimac, Va. (intrastate), observing same as maximum at intermediate points.

14323. **Limestone and stone dust**, C. L. Establish 201c net ton, Mascot, Tenn., to Cincinnati, Ohio. Truck competitive. Expires December 31, 1937.

14325. **Limestone, ground or pulverized**, loaded in open top equipment, C. L. Establish 336c net ton, Mascot and Strawberry Plains, Tenn., to Shreveport, La.

14348. **Hydrated biotite mica, crude, and vermiculite, crude**, C. L., minimum 80,000 lb. Establish 60c cwt., Libby, Mont., to points in Southern territory taking Groups L and M, and 65c to points taking Group K.

14375. Establish 250c on common or moulding and 275c net ton on ground or pulverized **sand**, Ottawa, Ill., to St. Matthews, Ky.

14376. **Slate granules**, C. L., minimum 50,000 lb. Establish to St. Matthews, Ky., from Poultney, Vt., 430c; Slatington, Penn., and Whiteford, Md., 450c; Copley, Ohio, 520c, and Wausau, Wis., 800c net ton.

14383. **Vermiculite, crude (vermiculite ore)**, C. L., minimum 80,000 lb. Establish 930c net ton, Encampment, Wyo., to Mobile, Ala.

14395. **Fuller's earth**, C. L., minimum 50,000 lb. Establish 175c net ton, Superior Fla., to Jacksonville, Fla. (on traffic destined Pacific coast via Panama Canal).

14443. **Gravel**, C. L., cancel present intrastate rate of 55c net ton from Nashville, Tenn., to Lewisburg, Tenn., allowing standard scale rate of 80c to apply.

14527. **Soapstone or talc**, pulverized, C. L. Establish from Tate, Ga., to Savannah and Port Wentworth, Ga., 245c; New Orleans, La., 325c, and Mobile, Ala., 285c per net ton.

14617. **Limestone**, crushed or ground, C. L., minimum 60,000 lb. Establish rates in cents per net ton as follows:

From	A	To B	C
Cartersville, Ga.	241	211	...
Whitestone, Ga.	251	221	221
Tate, Ga.	251	221	221

(On traffic destined Pacific Coast via Panama Canal.)

A—New Orleans, La., and Gulfport, Miss.
B—Mobile, Ala., and Pensacola, Fla.
C—Jacksonville, Fla., Brunswick and Savannah, Ga., and Charleston, S. C.

14618. **Limestone or marble**, ground or pulverized, C. L., minimum 88,000 lb. Establish to St. Louis, Mo., and E. St. Louis, Ill., from Tate, Whitestone and Cartersville, Ga., 252c, and Dolcito, Ala., 216c per net ton.

14619. **Fluxing rock and gravel** (for furnace use), C. L. Establish 50c per net ton from Iron City, Tenn., to Rockdale, Tenn. (intrastate).

Western

Sup. 1 to D-43-34. **Stone**, broken, crushed or ground, C. L. (See Note 3). In no case less than 40,000 lb., from Krause and Stolle, Ill. Proposed, to Oshkosh, Wis., 14; Eau Claire, Wis., 14; Menominee, Mich., 16, and points usually grouped therewith. Rates in cents per 100 lb.

C-43-35. **Lime rock**, C. L. (See Note 3), but not less than 60,000 lb., from Mason City, Iowa, to Grand Island, Neb. Proposed —200c per ton.

C-41-210. **Sand**, C. L. (See Note 3). In no case less than 40,000 lb. From Eggleston, Minn., to destinations in Illinois, Wisconsin and Iowa named in Items 3740, 3750 and 3760 to which rates are provided from Redwing, Minn., Bay City, Mich., and Hager, Wis. Proposed—To establish same rates as apply from Redwing, Bay City or Hager to destinations shown in items referred to.

D-43-38. **Stone**, crushed, **rubble stone**, etc., minimum weight and description as per Item 2420 of W. T. L. Tariff 6-S, from Ablemans, Wis., to Keokuk, Ia. Proposed—10c per 100 lb.

C-41-211. **Stone**, crushed, C. L., as described in Agent Kipp's Tariff 50-P, Item 4170, from Ely, Minn., to Memphis, Tenn. Proposed—$5.55 per ton of 2000 lb.

D-41-213. **Sand and gravel**, C. L., from Oreapolis, Louisville, South Bend, Valley and Fremont, Neb., to Omaha, Neb. Proposed, 35c per net ton.

D-41-214. **Stone**, broken or crushed, C. L., minimum weight per Item 1401 series, S. F. T. B. Tariff 66-G, from Ohio and Mississippi River crossings named in Item 1401 series, S. F. T. B. Tariff 66-G, on traffic originating at points in Southeastern territory, and from Memphis, Tenn., to (A) Lower Missouri River crossings and points taking same rates. Proposed, 16½c per 100 lb.

D-155-4. **Fluorspar**, C. L., min. wt. 60,000 lb.

To—	†
New York	59
Baltimore	59
Bethlehem	59
Pittsburgh	53
Lackawanna	53
Youngstown	53
Wilmington	59
Philadelphia	59
New Orleans	44

† From Colorado common points, Boulder, Canon City, etc., Northgate, Colo.

E-41-215. **Silica** (white sand), including ground silica straight or mixed carloads, from Hermann, Mo., to St. Louis, Mo., E. St. Louis, Granite City and Madison, Ill. Proposed—In cents per ton of 2000 lb.: To St. Louis, Mo., 70; E. St. Louis, Ill., 82; Granite City, Ill., 82; Madison, Ill., 82. (See Note 3) but not less than 40,000 lb.

E-41-216. **Sand, silica**, C. L. (See Note 3) but not less than 40,000 lb., from Wedron, Ill., to Redfield, Ia. Proposed—$2.20 per net ton.

E-43-40. **Gypsum rock**, C. L. From Blue Rapids, Irving, Medicine Lodge, Sun City and Kling, Kan., to Kansas City, Mo. Proposed—7c per 100 lb., (See Note 3) but not less than 50,000 lb.

Southwestern

10989. To establish on **asphalt rock**, natural or coated, and **stone**, crushed, coated, as described in Item 1200-I, S. W. L. Tariff 162-K, from Ada and Valliant, Okla., to Texas destinations named in Item 1200-I, the same basis of rates (distance rates) as currently applicable from Crusher Spur, Dougherty, Stringtown and Sulphur, Okla., to the same destination in Item 1200-I.

11023. To establish rate of 98c per ton of 2000 lb. on **crushed stone**, carloads, from Moline, Kan., to Lamont, Okla.

11025. To establish rate of $1.08 per ton of 2000 lb. on **crushed stone** from Moline, Kan., to Coyle, Okla.

11026. To establish specific commodity rates on **rock asphalt**, carloads, from Dougherty, Okla., to points in Colorado on the A. T. & S. F. Ry. Following are rates proposed in cents per ton of 2000 lb.:

Holly, 290; Lamar, 310; Pueblo, 340; Colorado Springs, 360; Denver, 380; Springfield, 290; Trinidad, 330.

11027. To amend Item 1358-G, Supplement 107, S. W. L. Tariff 14-Q, applying on **feldspar** to include Salida, Colo., as a specific point of origin, at rate of 25c per ton of 2000 lb. higher than the rates from Canon City, Colo., to the Texas points named therein.

11123. Establish rate of 80c per ton on **sand and gravel**, straight or mixed carloads, from Neame, La., to Port Arthur, Tex.

11132. To establish rate of 250c per net ton on **chatt sand** (See Note 2), from Webb City-Carterville, Mo., to Decatur, Ill.

11201. To establish rate of 63c per net ton of 2000 lb. on **sand and gravel**, carloads, from Arkansas City, Kan., to Lamont, Okla.

11212. To establish the Class 30 rating on **vermiculite** other than crude, carloads, minimum weight 24,000 lb., subject to Rule 34, for application between all points covered by S. W. L. Tariff 61-B.

Illinois

7497-9. **Agricultural limestone**, in bags, barrels or bulk, C. L. (See Note 2), from Chester, Ill., to New Burnside, Ill. Proposed, 93c per net ton.

7959-3-B. **Agricultural screenings or dust** (fertilizer limestone), ground sufficiently fine so as to be suitable for acid soil treatment, C. L., from Krause and Valmeyer, Ill., to stations on the Ill. Term. R. R.:

	From Krause, Ill.	From Valmeyer, Ill.
North Wood River, Ill.	70	75
Edwardsville, Ill.	70	75
East Collinsville, Ill.	65	70
Troy, Ill.	73	78
Litchfield, Ill.	73	78
Carlinville, Ill.	73	78

7959-6. **Crushed stone**, C. L. (See Note 3), but not less than 40,000 lb. Agricultural limestone, ground or pulverized, in bags, barrels or in bulk, min. wt. 60,000 lb., to Sou. Ry. stations in Illinois:

	From East St. Louis, Ill.	From Falling Springs, Ill.
Lake, Ill.	55	55
Scott Field, Ill.	63	63
Walnut Hill, Ill.	76	76
Marlow, Ill.	88	95
Wayne City, Ill.	101	101
Fairfield, Ill.	101	101
Mt. Carmel, Ill.	111	111

Texas-Louisiana

2111-TX (File 10070-1-TX). To amend Southern Pacific Lines Tariff 974-E, by authorizing crushing in transit at Sudduth of **stone** originating at Llano to the same extent as now authorized at Austin. The operator of a stone quarry and crushing plant at Sudduth, Tex., has requested this. Sudduth is intermediate between Llano and Austin.

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I. C. C. Reports

27372, New Mexico Construction Co., Inc., vs. A. T. & S. F. et al. By division 4. Rates, **asphalt rock**, natural or coated with not to exceed 5% road oil, crushed or ground, Hawks, N. M., to Florence, Colo., not unreasonable for Santa Fe delivery; but the through rate of $5.20 assailed to Florence unreasonable to the extent the factor from Pueblo to Florence exceeded $1.15. Further found that the assailed rate to Salida is unreasonable to the extent the factor from Pueblo to Salida exceeded, or may exceed $1.50. Reparation awarded and new rate ordered established not later than July 22.

27473, Florence Stove Co. vs. Boston & Maine et al., embracing also 27498, Arcade Malleable Iron Co. vs. Boston & Albany et al. By division 4. Rates **molding sand**, Elnora, N. Y., to Gardner, Mass., and from Ushers, Schuylerville, and Saratoga Springs, N. Y., to Worcester, Mass., and on **silica sand**, Millville and Manumuskin, N. J., to Worcester, found unreasonable. The unreasonableness found is to the extent that the assailed rate on molding sand exceeded $2 a net ton from Elnora to Gardner and $2.45 from Ushers, Schuylerville and Saratoga Springs to Worcester; and $3.80 and $3.40 on silica sand in box and open-top cars, respectively, Millville and Manumuskin to Worcester on shipments routed via Allentown and $4 and $3.60 on silica sand in box and open-top cars, respectively, on shipments routed via Pavonia. Reparation awarded.

Fourth section application 16624. By division 2. Carriers authorized in fourth section order 12778 to establish and maintain for the transportation of **soapstone and talc**, from Henry (Franklin County), Va., to destinations in central Illinois, trunk line, New England, and Buffalo-Pittsburgh territories, over all routes over which they have relief concurrently with respect to the class rates, the lowest rates that may be constructed over any line from and to the same points on the basis of 2c a 100 lb. over rates from Roanoke, Va., constructed on the basis of percentages of the first class rates and to maintain higher rates to intermediate points.

21894, Lehigh Stone Co. vs. B. & O. et al. By division 4. On further hearing prior findings further modified so as to permit defendants to establish a rate of 55c a net ton, to expire Dec. 31, 1937, **sand, gravel and crushed stone**, to Merrillville, Ind., from Joliet, Plainfield, McCook and Bellewood, Ill., and Peru, Ind.

Fourth section application 16564. By division 2. By fourth section order 12757 authority denied to establish rates, **cement**, from trunk-line and New England producing points to points in the Boston, Mass., metropolitan district, without observing the long-and-short-haul provision of section 4. The Commission said the purpose of the relief prayed was to enable the applicants to establish reduced rates alleged to be necessary to obtain traffic from domestic cement producing points to Boston, at which points the domestic product was in competition with imported cement from Belgium, Great Britain, Germany, Denmark, Poland, France and Norway. It said the proposed rates were based on 70% of the distance scale of rates, called the 18112 scale, prescribed in New England Cement Rates, 155 I. C. C. 601, for application from trunk-line to New England territories. It said numerous domestic producers in the affected territory intervened in support of the application, and the Maritime Association of the Boston Chamber of Commerce, the Boston Port Authority and a dealer in building material and imported cement at Boston intervened in opposition thereto. The Commission said there was no evidence of any movement of cement by water to Boston from origins in the United States nor of actual competition by all-water or rail-water routes from the points of origin from which relief was sought.

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Shippers Protest Cement Rate Boost

Increased freight rates became effective April 20 on a number of commodities, including portland cement, by acquiescence of the Interstate Commerce Commission to schedules filed by the railroads about a month before. Traffic managers of the leading cement companies are protesting the increase, stating that increases in rates would hamper recovery in the cement industry and put domestic cement producers at a disadvantage in competing with foreign producers.

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Nebraska Rates Cut

The Nebraska Railway Commission has reduced rates on sand and gravel for various shipping points, of which the following is typical: Reduction of 10c a ton on shipments from Bridgeport to Alliance and Hemingford. Other reductions under consideration are: 5c, from Ainsworth to Nenzel; 10c, from South Bend to Malmo; 5c, from Columbus to Omaha.

The Burlington Railroad has asked the Nebraska state railway commission for permission to reduce its rates on sand and gravel from Central City to Loup City, 10c per ton. The Rock Island has withdrawn its application for a reduction in its sand and gravel rates from Fairbury to Ellis from 50 to 40c, and to Beatrice from 50 to 45c.

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Bars Gypsum Allowance

The Interstate Commerce Commission has ordered the New York Central to cancel certain schedules proposing to pay the United States Gypsum Co. an allowance not to exceed $3 a car for terminal services performed by the latter company in spotting cars within its plant at Gypsum, Ohio.

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Rates Await I. C. C. Action

Changes in existing sand and gravel rates in Mississippi will not be made, the State Railroad Commission has decided, until the Interstate Commerce Commission takes some action upon a petition filed in December by a group of railroads complaining of the Mississippi rates.

The commission issued an order just before adjourning its May meeting serving notice that all existing special and reduced rates on sand and gravel will remain in effect and that in all other cases the general scale fixed by the commission will constitute the legal rates.

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Appeals to Higher Court

F. F. Shields Co., Omaha, Neb., has appealed from a Douglas district court finding that the Burlington did not owe it $2937 as excess over a reasonable rate charged for transportation of sand and gravel from Allis to Omaha in 1931. The company said it was charged 15c a ton more than others hauling material from Platte river pits to Omaha. The railroad contended that the statute of limitations barred recovery.

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Relief Granted on Sand

The Interstate Commerce Commission has granted Chicago and North Western railway relief until Nov. 16 from the long and short haul provision on shipments of **sand and gravel** from Janesville and Afton, Wis., to Arlington Heights, Ill. The commission set the authorized rates at not less than 50c a ton, with higher rates on shipments from, to, and between intermediate points.

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Gravel Rate Cut

The Texas state railroad commission recently ordered a 24c reduction of the rail rate on **gravel** from Fayetteville to Houston and Harris County. The rate was set at 66c. The old rate was 90c.

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Road Materials Rate Cut

The Arkansas Corporation Commission has secured an agreement with all railroads operating in the state except the St. Louis-San Francisco, to handle highway materials at a freight rate reduction of 20%.

New President

NATIONAL CEMENT CO., Ragland, Ala., with offices in Birmingham, has made George A. Nicholson, son of the late George E. Nicholson, president of the company to succeed his father. He has been vice-president. Leonard E. Bayer was promoted from assistant to the president to executive vice-president. J. M. Dannelly, Jr., continues as vice-president in charge of sales.

More Power

LEHIGH PORTLAND CEMENT CO., Metaline Falls, Wash., plant is building a new flume to supply water for its hydroelectric power plant. When the installation is completed it is expected the power plant will be able to develop 4000 hp.

Entertains Engineers

LONE STAR CEMENT CO., Hudson, N. Y., plant entertained members of the Connecticut Society of Civil Engineers on April 29 at the first meeting the society had ever held outside the state. After an inspection of the plant, D. P. Cooper, vice-president of the company addressed the group at a complimentary luncheon.

Concrete Products
Cement Products

Willem Van Vliet's Creations Are Sold All Over New England

By ALFRED ELDEN,
Portland, Maine

WILLEM VAN VLIET, a Hollander now about 45, came to this country from Rotterdam when he was 16. A fair carpenter as a youngster, he worked his way over as an assistant to "Chips" on a sailing vessel. When he disembarked at Portland, Maine, he had $2 in his pocket and one word of English in his vocabulary. It was "Job."

He developed extraordinary ability as a wood worker and sculptor, and is a cabinet maker today. He married a Portland girl when he was 20 and has nine children. At present he lives in Westbrook, a suburb of Portland, where he creates his "Wonder Work."

About ten years ago Mr. Van Vliet turned his attention to cement. Today that is his specialty. He began to experiment with lawn ornaments.

Out of modeler's wax he fashioned a rabbit. Then he made his moulds for each half of a cement mixture. When these hardened he varnished them to prevent his cast from sticking to the mould and developed a way to lock the two halves of the mould together that was entirely original. He claims his success is largely due to the manner in which he makes his mixture, just the right proportions of cement and sand, frequent wetting during hardening and many other little tricks. His rabbits and bird baths are to be found all over New England today.

Big department stores in Portland, Boston and New York began clamoring for his wares. Now he produces in cement, rabbits, bird baths of both ground and pedestal pattern, flower boxes and even lawn frogs, lions, tigers and figures four and five feet high. He turns out Grecian jars, gazing bowl stands, post caps, and now through a marvelous machine of his own invention, even square and octagonal articles.

He has also achieved quite a reputation as a builder of artistic fish pools which he constructs from rocks and cement. Some of his pools adorn the estates of wealthy and influential Maine citizens. He is now working on some devices that he is positive will make possible a wide variety of cement construction for the average farmer.

Willem Van Vliet and some of his handiwork

Rebuilding Main Street...

IS A JOB FOR

CONCRETE MASONRY

Watch the small commercial building market! It's coming back fast, and untold thousands of new stores, garages, banks, and neighborhood "business corners" will soon be built as communities expand.

For this class of building concrete masonry has everything—firesafety . . . permanence . . . low cost . . . and a surprising new and untold *beauty* story! These pictures give just a glimpse of what you can do, largely with standard units. Now is the time to line up architects and builders who have new ideas, and go after this hot market.

PORTLAND CEMENT ASSOCIATION

Dept. 6-45, 33 W. Grand Ave., Chicago, Ill.

●

Three attractive buildings at Orlando, Fla. Designed by Raymond C. Stevens. Built by Kiehl & Stevens. Concrete masonry supplied by Pittman Builders Supply Co. and Newell Block Co.

Lower left view shows one of numerous recent examples of concrete masonry at Fort Worth, Texas. Built by C. S. Radford. Concrete masonry furnished by Chase Building Products, Inc.

Aerial view of the granite quarry and operation of Consolidated Quarries Corp. near Lithonia, Ga.

Consolidated Quarries Corporation's

CONCRETE BRICK PLANT

VERY BEAUTIFUL concrete brick are now being manufactured and sold by the Consolidated Quarries Corp. at its Lithonia, Ga., granite quarry and crushing plant. These are made from carefully prepared and proportioned screenings from the crushed-stone operation (described in previous issues of ROCK PRODUCTS).

The brick plant was built in 1936 and has been doing a good business ever since. The brick are made on a W. E. Dunn Manufacturing Co. "Dunbrik" machine.

The editor is indebted to Nelson Severinghaus, superintendent, for the accompanying illustrations, one of which is an aeroplane view of the whole operation. What looks like snow is sparkling granite. One may readily believe that brick made from it are pretty.

The concrete brick plant, showing storage of products

New plant office building of granite concrete brick

Concrete products exhibit of Cinder Block Inc., at Builders' Show recently held in Detroit

CINDER BLOCK INC., DETROIT, MICHIGAN

Creates New Shapes and Designs

DRAFTING DEPARTMENT HELPS ARCHITECTS AND BUILDERS TOO

By Bror Nordberg

A VASTLY STIMULATED DEMAND for residential, commercial and industrial building in the Detroit, Mich., area has brought about a corresponding demand for building block for subgrade construction and for partitions, back-up and exteriors above grade. Building of residences and other structures of concrete block has gained considerable momentum, partly due to the efforts of builders such as Albert E. Bill, who has had particular success in introducing the low-cost residence of concrete masonry, and to the efforts of architects and the aggressiveness and resourcefulness of some of the concrete products manufacturers.

In Detroit, the more elaborate and imposing structures such as theatres, offices, radio studios and state buildings are continually taking more and more of the products made by these concerns, adding considerable tonnage to already large demands for use in the more conventional types of construction. Aggressiveness and salesmanship alone have not brought about this condition. The products manufacturer who is getting this business is the one who not only coöperates with the architect and builder, but creates new shapes, designs and arrangements for his products that would be hard to beat for beauty, which is one of the most important requirements in these structures.

Cinder Block Inc., Detroit, already a large concern, has been so successful the past few years, particularly in the grade A type of building, that its plant capacity has been materially increased and a drafting department has been added for service to the architect, or as a means for showing him what can be done in the way of specials, and also to make working plans for use in the plant.

New Cinder Crushing Plant

All products are made from a very hard clinker cinder aggregate, available from local power plants. Present production requires from 100 to 200 cu. yd. of crushed cinders daily, making the handling of cinders and the keeping of a ready supply on hand at all times of great importance.

Until the installation of cinder-crushing and handling equipment this spring, cinders were trucked to a single crusher from the uncrushed cinder stockpile, and crushed cinders were delivered direct to the boot of the elevator filling the plant bin above the mixer. There was no storage provided for crushed cinders in event of a breakdown.

In March, 1937, modern equipment was installed in a new 35x80-ft. cinder crushing plant and stockpiling was provided for storage of sufficient crushed cinders for a month's run. This provided another advantage, too often overlooked, the desirability of "curing" cinders before their use in concrete. By long exposure to the atmosphere, free lime and undesirable solubles are eliminated.

Cinders and clinkers are hauled from the local electric power plant and other sources of supply by truck to the storage pile adjacent to the new plant. Gen-

erally, about 8000 cu. yd. of uncrushed cinders are stocked.

A Barber-Greene portable loader fills 10-yd. end-dump trucks with uncrushed cinders. The trucks back up an incline to a 15-yd. hopper directly above the Jeffrey type BB, 24x20-in. hammer mill used as a primary crusher. Cinders are fed to the crusher by a Jeffrey vibrating feeder through an 18x30-in. grizzley. Fines are kept out of the crusher by the grizzley and act as a cushion on the conveyor for the larger particles passing through the crusher. Plus 1-in. material is reduced through the crusher to 1-in. and under and joins the by-passed stream (minus 1-in.) on the belt conveyor below.

Screening Plant

Crushed and by-passed cinders are carried over an inclined 22-in. Jeffrey belt conveyor on 36-ft. centers to the secondary Jeffrey 24x30-in. double-roll crusher, to be reduced to ⅜ in. and under. Directly above the crusher is a 60x30-in. Jeffrey-Traylor vibrating screen. Here the fines are removed (⅜-in. and under) and by-pass under the crusher. The 1-in. to ⅜-in. cinders are reduced to ⅜-in. and under through this crusher.

When wet, cinders present a screening and crushing problem, which is met by changing screen cloths often to meet the conditions. Generally, larger openings are substituted when wet cinders

LEFT—New cinder crushing and handling plant. Truck hopper is at left. Crushed cinders are being stacked from elevator on right

CENTER, LEFT—Primary crusher for cinders. Above it is vibrating feeder from truck hopper; conveyor to secondary crusher is in background

CENTER, RIGHT—Close-up of conveyor from primary to secondary crusher

BOTTOM, LEFT—Hopper and screen above secondary crusher

BOTTOM, RIGHT—Secondary crusher in foreground, vibrating screen above

Another view of the primary crusher for cinders

New automatic stripper used in making block

General view of the operation of Cinder Block Inc., Detroit, Mich.

show a tendency to stick and cake. Some fines are passed through with the ⅜- to 1-in. sizes to serve as a cushion for the crusher.

Cinders are elevated by a 40-ft. Jeffrey bucket elevator with 9-in. buckets, for outside stockpiling. The plant has a daily capacity of 400 cu. yd. of minus ⅜-in. cinders in 9 hours.

The Barber-Greene loader loads 10-yd. trucks with crushed cinders, which are hauled to the plant to be elevated to the 100-yd. storage bin serving the block machines. Better than one full bin is used for each day's operations.

Block Manufacture

The plant capacity for concrete block has been considerably increased by the addition of a second fully-automatic Besser, single-pallet, block machine, and 40-cu. ft. mixer. Each of the machines has a capacity of six block a minute, and a day's run requires the use of about 6200 pallets. Back-up block are made two on a pallet. Recently, the manufacture of cinder brick on the Besser machines has been started; twelve bricks are made at one time on a pallet, a single machine turning out 36,000 brick in a 9-hour day.

Block are made of standard portland cement, high early strength cement being used in the winter, and are cured by steam heat for 16 hours in the kilns. The six kilns each hold 24 cars or about 10,500 of 8-in. block or 6900 of 12-in. block.

Typical Contracts

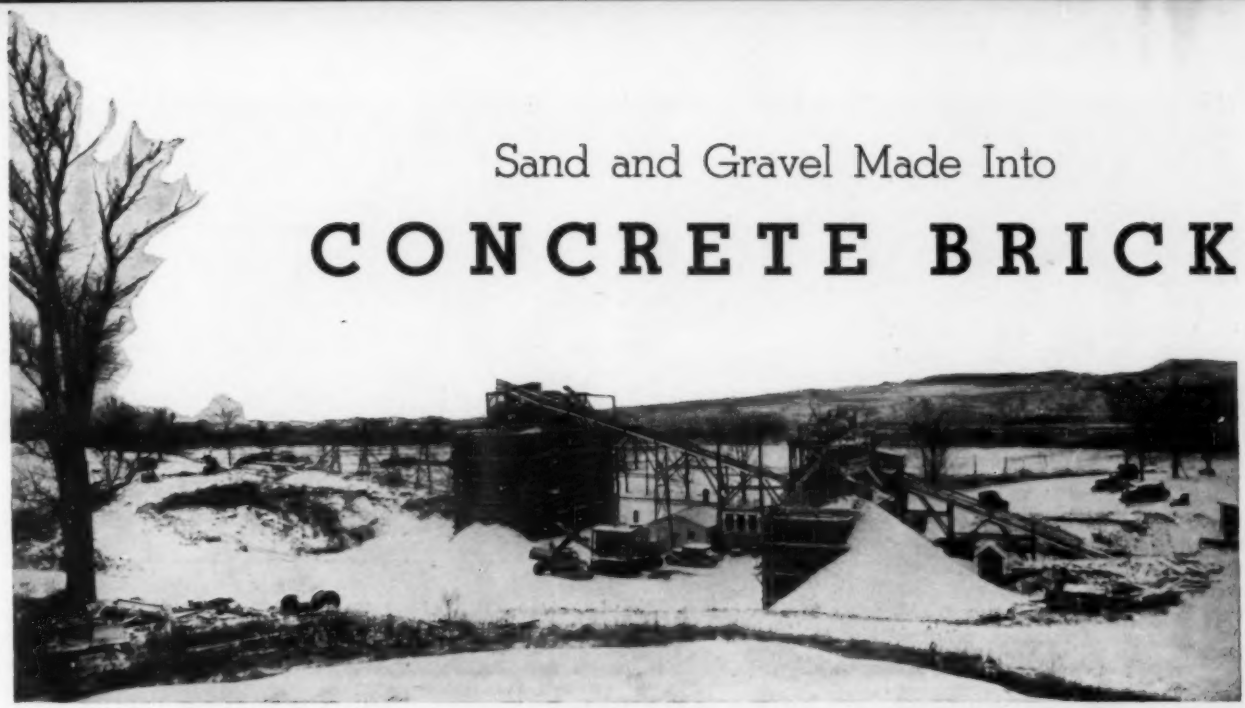
Among the outstanding jobs now on contract is the state hospital job starting shortly near Ypsilanti, Mich. Four buildings are to be built, requiring about 200,000 units for back-up, partitions and brick for the header courses. Albert E. Bill, Detroit builder, who started an up-and-going business in exclusively building concrete masonry low-cost homes, has under construction about 40 homes of cinder block. Fluted pilasters, bull-nose block, jams, sills, and lintels are some of the specials being made for four theatre jobs now under construction. Working drawings are made in the office and specials are made by hand, all electrically vibrated.

New Use for Trucks

SUPERIOR COAL & ICE CO., Hubbard, Ohio, is going to find another use for its fleet of three trucks by manufacturing concrete block.

Cinder Block Inc. furnished the cinder brick used in this colonial-style home

One of Albert E. Bill's cinder concrete houses in Detroit, erected for less than $4000 each



Sand and Gravel Made Into

CONCRETE BRICK

The sand and gravel plant produces the pea gravel and sand used in the company's manufacture of concrete brick

F. A. Rider, Inc., Endicott, N. Y.

WITH THE REVIVAL of residential and other types of building, F. A. Rider, Inc., Endicott, N. Y., producer of sand and gravel for eleven years, went into production of concrete brick in 1936, recognizing possibilities once the product has been introduced and accepted. The volume of sales grew rapidly, and, according to F. A. Rider, president, when interviewed early this year, it "looks good for 1937."

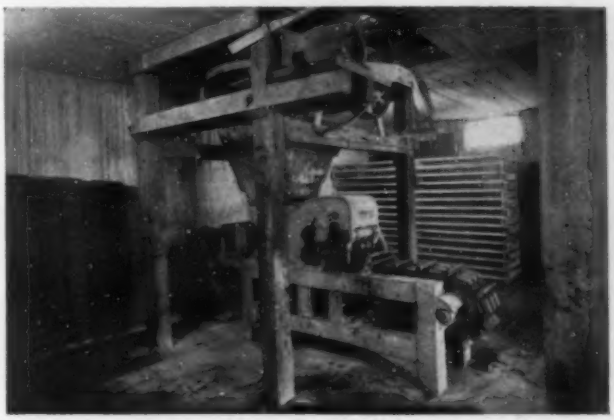
The concrete brick plant is located near the aggregates plant, only five miles from Binghamton, N. Y., where much clay brick is manufactured.

A good deal of personal contact work was necessary at first to acquaint architects and contractors with the advantages of concrete over local competitive clay brick. Concrete brick are being sold as a quality product and on a favorable price basis. The main competitive brick is manufactured from shale, weighs about 1 lb. more than the Rider "Dunbrik," and has lower compressive strength and a higher degree of absorption. Other advantages of Dunbrik are sharper, cleaner edges and no warping. These are the qualities emphasized in sales literature. It has brought the desired results.

Equipment manufactured by the W. E. Dunn Manufacturing Co. was installed early in 1936 for the manufacture of the patented concrete Dunbrik. Other units manufactured in multiple sizes are the Dunstone, for use in coursed or ashlar construction. Uncolored brick are sold as "common" brick and brick of any color desired may be furnished.

The equipment consists of a Dunn commercial sized, straight-line, continuous production brick machine and the Dunn 16-cu. ft. blade mixer feeding it from above. The plant housing the equipment is a concrete building which later will be the basement of a garage and storage shed above. The mixing floor for the manufacture of brick is above.

One of Mr. Rider's main reasons for going into the manufacture of concrete brick, other than the fact that he felt that there was a market, was an overabundance of "slow-moving" pea gravel. Approximately 15% or more of the entire output of the sand and gravel plant



Two views of the brick-making equipment of F. A. Rider, Inc., Endicott, N. Y.

is this pea gravel, for which there is little call.

This 5/16 to ½-in. uncrushed pea gravel is the coarse aggregate used in the manufacture of Dunbrik. Gravel and sand are batched before being hauled by truck and dumped into the mixer. Cement and water are added at the same time. A very low water-cement ratio is used, making a comparatively dry mix.

The mix is chuted to the brick machine, where 1800 bricks are manufactured per hour. Finished brick are removed to a Matthews roller conveyor and are placed in racks for curing. The building is of such a floor area as to allow for storage of about 60,000 brick. Generally, all bricks are manufactured from standard portland cement and are water-sprayed while curing in the building. For rush orders, calcium chloride and high early strength cements are used to permit early shipments. Generally, brick are cured a minimum of seven days before shipping to the job. At a later date, provision will likely be made for steam curing.

Instead of mixing coloring oxides into the mix in manufacturing colored brick, a coating is sprayed on the brick by a Dunn spray gun. The brick are cured before spraying and are stacked. Any color desired can be had, the oxides used being mixed in the machine. For light colors, a white sand is used, while for darker shades, sand from the aggregates plant is suitable.

Power requirements for the plant are unusually low, a 1-hp. motor being used to drive the spray gun and mixer and a 3-hp. motor to drive the main equipment. The company has been given the exclusive franchise for the manufacture of Dunbrik to serve three counties in New York State and the three adjoining ones in Pennsylvania.

Sand and Gravel Plant

The sand and gravel plant, producing the pea gravel and sand used, was built in 1930. It has an output averaging 150 tons of gravel, sand and crushed gravel per hour. A pit deposit, sand and limestone pebbles, is being worked. Originally excavation was with a 2-yd. dragline, which was replaced by a shovel and trucks.

A 1-yd., B-3 Bucyrus-Erie shovel excavates the material and loads the trucks, which discharge to a field hopper. Material is carried to the scalping screen over three 24-in. field conveyors with a total length of 600 ft. The flow of material is regulated by two Good Roads Champion plate feeders and a reciprocating feeder of home-made design.

Scalping is done over a single-deck 4x8-ft. Niagara screen. About 50% of the gravel is of a size to require crushing. Gravel 1½ in. and over passes through a 10x40-in. Good Roads jaw crusher, and 1 to 1½-in. gravel to a 2-ft. Symons cone. The products of the two crushers join and go to the sizing screens.

Four sizes, ⅛ to ⅜, ⅜ to ¾, ¾ to 1¼, and 1¼ to 2¼ in. of crushed gravel, are produced over a 42-in. by 20 ft. Good Roads Champion revolving screen with a scrubber section; and ¾-in., 1A's and fines are sized out over a double-deck 3x8-ft. Niagara screen. The fines are diverted and added to the sand. The storage capacity for crushed gravel is 300 tons.

Minus 1½-in. gravel goes direct from the scalping screen to the screening plant; and 5/16 to ¾ in. (pea gravel), sand, and ¾ to 1½ in. stone are sized out over a 42-in. by 20 ft. revolving Champion screen. Storage capacity for sand and uncrushed gravel is 1200 tons. At times, the larger gravel is taken from the bins by trucks to be crushed. A 40-ft. centers conveyor feeds this gravel to the crushers.

A few years ago a 150-ton Erie Aggremeter batching plant was erected for use in proportioning aggregates for road construction. Aggregates are weighed out in a 3-compartment weighing batcher. Practically all unbatched aggregates are shipped by trucks, which also haul to a loading ramp for rail shipments.

MERCHANDISING CONCRETE PRODUCTS

Part 7—Sales Promotion

By H. O. Hayes

WHEN A BUILDER opens a demonstration house to the public and publicizes it as containing the last word in modern construction he is dramatizing his merchandise — creating public interest in what he has to offer—creating prospective buyers. He is applying *showmanship* to his business.

Sales promotion, well done, attracts favorable attention to your product; emphasizes particular features about the product; relates those features to the buyer's interest; and stimulates him to action—certainly a long and desirable step in building sales, to accomplish which is no little assignment. But that it is entirely practicable for the manufacturer of concrete masonry and concrete joists is quickly evident.

Suppose this manufacturer gets a local builder to coöperate on a model house, using concrete masonry and concrete floor joist construction. Use of these products in a model house implies superiority. And the public is attracted to the model. So, if the model has been properly executed, the manufacturer wins favorable public attention—the first objective.

With people passing through the house built of his products he can demonstrate attractive methods of finishing walls of concrete masonry, the quality of concrete joist floors, and perhaps the acoustical value of exposed concrete masonry. Thus, particular features of the products are emphasized —the second objective.

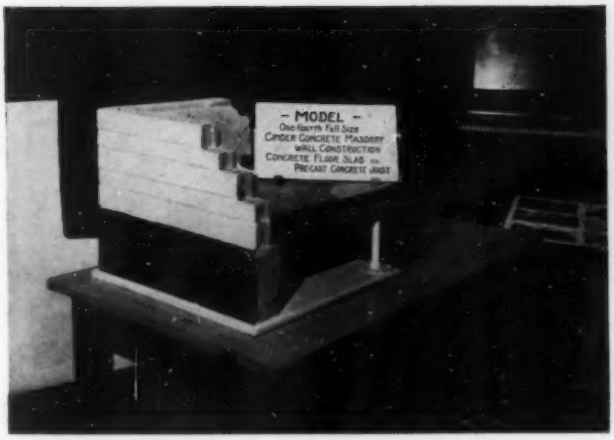
Going through the house, visitors become conscious of the fact that concrete masonry and concrete joists are structural parts of houses and buildings — not just piles of uniformly shaped blocks of dull looking concrete. And, since visitors are interested in houses, the products become related to the buyer's interest—a third objective of sales promotion.

Seeing all of the attractions of a modern home, visitors become dissatisfied with their present homes; start thinking of ways to have a modern house, or to improve the house they have. In that way, people are stimulated to action—a fourth objective of the promotion.

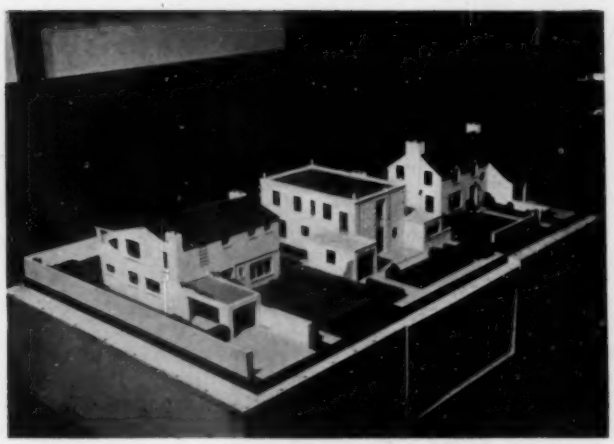
Thus, people who have had no interest in you or your products, but who may have been considering building a house, come to realize that what you make warrants their consideration, and open the door to a sale.

Finding a Sponsor

One of the first considerations is the sponsor, for the right sponsor can have a strong influence on the success of the project Usual sponsors of such projects are real estate men or builders. Other possibilities include the local news-



Model of concrete construction helps prospects visualize the use of concrete masonry and joists



Small house models are good for window display and for exhibit purposes

paper, a department store interested in house furnishing sales, a utility company or a local civic organization. In rare cases architects have taken part.

In any case, the sponsor should have a good reputation and the confidence of the local public. Often the real estate operator or builder will finance a project of this type to move property or to develop prospects. Organizations such as the American Legion, the Chamber of Commerce, or other local civic-minded groups have also sponsored model homes. Among other advantages of such sponsorship is the stimulus to attendance which they can create.

The model house should be well designed so that it will win the favorable reaction of those who see and visit it. With the designing, location and construction details settled, it then becomes important to plan ways to emphasize features of your product. Regardless of the sponsor, it is to his interest to show the quality and character of the construction. There are a number of ways to do this. A small area of wall and ceiling may be left exposed, or unfinished. Exhibit panels showing construction details may be arranged in some conspicuous place, or a group of construction views may be exhibited. Or a room may be turned into a miniature building show featuring various ways to use and finish your products in construction. It might even be worth while to prepare a movie to show the features and properties of your products, which could be shown at intervals during the exhibit.

Finally, a dramatic name should be selected for the house, which will quickly picture to the public that something new and highly desirable — the very last word—is to be seen at the exhibit house.

In its nation-wide campaign of demonstration houses, General Electric adopted the name of "The New American Home". Other names which have been used are the "Carefree Cottage", "Honeymoon Special", "Ultra-Modern", "Tomorrow's House", the "Silver Star", and the "Twenty-first Century House". While it may seem like a negligible thing, a dramatic name may provide a spark which will kindle public interest in the house.

Getting the Visitors

At this point promotion requires the help of advertising and publicity. The stage has been set. A crowd must be drawn. So advertising and publicity are used to bring volumes of visitors. There are many stunts that can be done to stimulate publicity and crowds. An excellent example wherein every conceivable scheme was used illustrated the various ways to apply showmanship.

First, a contest was started among school rooms for the best model of the house. The children had to take measurements at the house, and took their fathers along to help. So both fathers and children learned how the house was being built. As the house neared completion a popularity contest was started. The American Legion, which sponsored the house, set up a military organization to sell tickets to the house, getting posters in windows of many stores, which also sold tickets. Posters were put on all time clocks in the city. And minute men spoke at all theatres.

All Legion posts within a 300-mile radius were circularized, attracting many visitors from neighboring cities. And a sound-equipped truck was driven through towns and cities within a 100-mile radius.

When the house was open for inspection, the sound truck was used in front of the house to give a general description of it and to entertain the crowd while waiting to get in the house. And in each room, a Legionnaire who had been carefully trained to point out features, explained all about the details of the room.

All during the campaign the local newspapers coöperated actively, report-

Model houses, when well presented, attract many visitors and have great promotional possibilities

ed progress and developments. And cooperating contractors advertised at intervals. Needless to say, people for miles around became extremely conscious of this house and the materials of which it was built. The builder signed up a number of contracts with visitors, for which the concrete products manufacturer in turn has made sales. And the cost of the whole promotion, aside from time, was approximately the same as was being spent for advertising before the promotion was started.

Other Forms of Promotion

For the concrete products manufacturer the demonstration house is one of the best pieces of sales promotion that he can do. But there are other sales promotional activities that deserve attention.

Participating in a building show is a sales promotion activity. And when manufacturers do participate in building shows they should plan ways to make their exhibit dramatic. There are many ways this can be done. For instance, a hot flame can be kept on the face of a unit to show its fire resistance. A sample wall can be built and finished on the outside, and a spray of water played on the finish to show resistance to dampness. Or a good decorator can be employed to demonstrate various methods of decorating concrete masonry. To dress up the exhibit, decorated concrete masonry walls can be erected. Or large photo murals of outstanding jobs can be displayed around the room. Naturally it is desirable to have descriptive literature for prospects. And if a list of jobs in various parts of the city can be prepared, that is desirable.

Of a similar character are special demonstrations to show the various properties of your products. For instance, a floor panel of precast joist and slab construction might be built and tested before local building officials. A stunt of this character might well be carried out to obtain good publicity, getting a complete story of how this new development in floor construction is built, and showing how many times more than the required strength the floor has.

Or a fire test of a small room of concrete masonry could be made for officials of the fire department. This has been done with considerable success in a number of cities.

Office and plant displays, or a traveling exhibit built as an open trailer, are not expensive, and are effective sales tools. They should be built with care, and maintained to look well at all times. Displays of this kind are excellent to show various wall patterns, and decorative possibilities. They are especially valuable in introducing concrete masonry in the "above-ground" market.

A good window display is also desirable, where location is suitable, and may be altered from week to week, showing different jobs, miniature sample walls, or model houses, a number of which are now available from the Portland Cement Association.

Other activities that are a sales promotion function include product improvement studies, developing market research data, educational programs for contractors and builders, conducting contests of various character, and coördinating all merchandising activities.

Silo Plant

APPLETON CEMENT PRODUCTS CO., Appleton, Minn., is building another plant at Marshall, Minn., to make concrete-stave silos. Officers of the company are G. H. Howard, president; G. J. Benson, vice-president; H. A. Benson, secretary-treasurer; A. R. Aanes, director. Sand and gravel from the Nielsen-Deutz Sand and Gravel Co., Marshall, will be used.

New Plant

UNIVERSAL CAST STONE CO., Joliet, Ill., has completed construction of a new, modern plant for the manufacture of architectural cast stone, building block, including ashlar, concrete floor joists and roofing tile.

Products Plant

GEIGER ENGINEERING & MANUFACTURING CO., Irvington, N. Y., is erecting a $35,000 plant to make reinforced-concrete slabs for fabricated building units. They are intended for use for roofs, side walls and floors.

Expanding

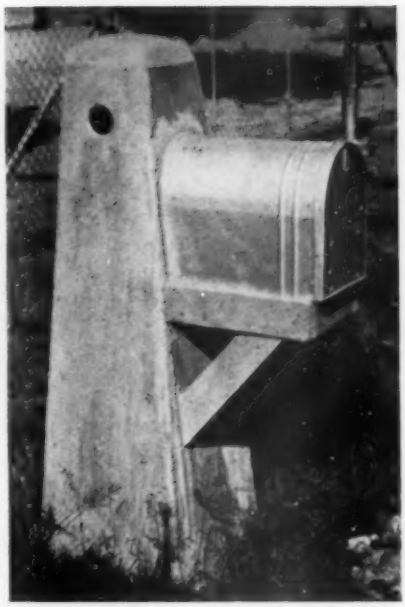
TRI-COUNTY SAND CO., Fittstown, Okla., has added six new concrete-mixer trucks to its ready-mixed concrete service. From an original two the company's fleet has been increased to sixteen in two years.

Change of Ownership

DINUBA CEMENT PIPE CO., Dinuba, Calif., has been purchased from A. A. Giuste by Rudolph Smith, N. C. Gray and Lafayette Kenard. Mr. Gray has been the superintendent of the plant.

Rebuilds

GRANITE CONCRETE BLOCK AND COAL CO., Elyria, Ohio, has established a new plant at North street and West avenue, following a fire which destroyed its former plant at Rust street.



Mail box set in concrete post

Farmer's Design

A FARMER, near Grand Rapids, Ohio, made this concrete support for his mail box. It could readily be made in quantity by a concrete products manufacturer for a considerable market. It is entirely of reinforced concrete (except, of course, the metal box). The black dot at the top of the post is a signal device—a red reflector.

New Pipe Plant

AUSTIN CONCRETE WORKS, INC., Austin, Tex., is building a plant to make reinforced-concrete pipe up to 42-in. diameter; estimated cost of plant and equipment $45,000. H. E. Wattinger is general manager.

To Make Ready-Mix

BAUGHMAN LUMBER CO., Bartlesville, Okla., is building the city's first ready-mixed concrete plant. Warren B. Ryder is general manager.

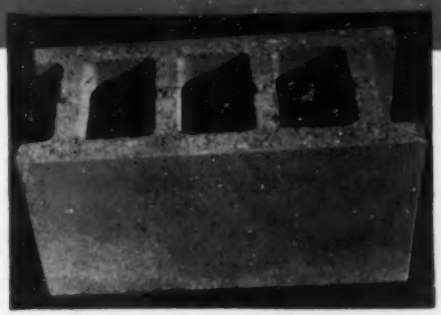
• • •

ROY T. HOKE LUMBER CO., Stillwater, Okla., is building a ready-mixed concrete plant in Coyle, Okla. Hal Hackleman is local manager. The company now operates a ready-mix plant in Stillwater.

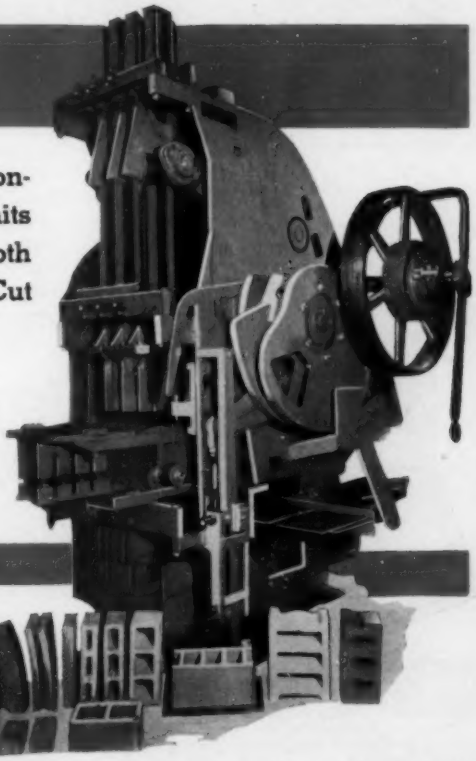
Expands Line

VALLEY CONCRETE PIPE CO., Yuba City, Calif., in the pipe business for 20 years, has expanded its line to include production of "Laymore" patented concrete building tile. Gilbert D. Williamson is president of the company.

BETTER BLOCKS AT LOWER COST MAKE IT MORE PROFITABLE



You Can Make Concrete Masonry Units That Are as Smooth and Perfect as Cut Stone



With the new Besser Plain Pallet Stripper all units are made with FULLY PRESSED TOP. The exclusive Besser Stripping operation smooths the top of the unit by pressure of the stripper head. This makes the edges and corners true and square. No other strippers have ever made units so perfect and fine appearing. No other units have ever received such praise from builders and architects. Make these units and you can profit by their popularity.

The Sona Cement Products Co. of Detroit, Mich., make an average assortment of units using only one set of plain pallets. Their Besser Plain Pallet Stripper cost less than the amount saved on pallets.

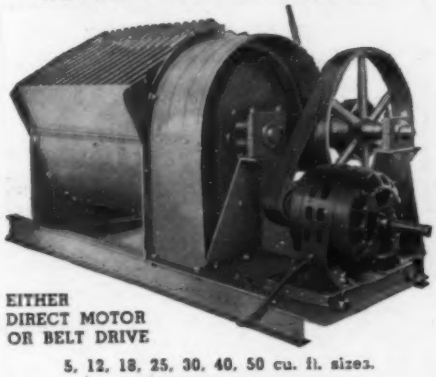
Only One Set of Plain Pallets Required to Make All These Units and an Unlimited Number More

BESSER PLAIN PALLET STRIPPERS

Capacities from 500 to 4000 Units Per Day—A Size and Model for Any Size Plant

FULLY AUTOMATIC—3 Models—Capacities: 2000 to 4000 per day.
SEMI-AUTOMATIC—4 Models—Capacities: 1000 to 2000 units per day.
POWER OPERATED with
Hand-Controls—2 Models—Capacities: 500 to 1000 units per day.
MULTI-MOLD
Hand Operated—Capacity: up to 300 units per day.
For manhole blocks, slabs and small cored units.
AUTOMATIC BRICK MACHINES—Capacities from 10,000 to 50,000 units per day. For brick, slabs, coal cubes and other small units.

BESSER BATCH MIXERS



EITHER
DIRECT MOTOR
OR BELT DRIVE

5, 12, 18, 25, 30, 40, 50 cu. ft. sizes.
Ask for Illustrated Catalog

You Can Make BETTER Blocks, FASTER and for LESS COST on a BESSER PLAIN PALLET STRIPPER

Ask for BESSER PLAIN PALLET STRIPPER CATALOG State Production Capacity You Are Interested in

BESSER MANUFACTURING CO.

COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS

Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL, HOBBS, UNIVERSAL, PORTLAND

206 37th STREET — ALPENA, MICHIGAN

EVERY CONCRETE PRODUCTS PLANT NEEDS A BESSER PLAIN PALLET STRIPPER

To Have Code

CONCRETE BURIAL VAULT MANUFACTURERS' ASSOCIATION, Ralph W. Meade, Cleveland, Ohio, secretary, adopted a code of fair trade practices after a conference with the Federal Trade Commission, at its recent annual meeting in Boston, Mass.

Intensive Promotion

JOHNS-MANVILLE CORP., New York City, is conducting an intensive promotional campaign to sell its "Triple Insulated House" plan. In order to receive the benefits of tying in with this nation-wide promotional plan, the local builder need only construct a well-built house according to sound plans and specifications of his and his architect's selection with: (1) a roof of J-M asbestos-cement shingles; (2) exterior walls of J-M asbestos-cement shingles or clapboard (brick or stucco or stone veneer walls may be substituted if applied over J-M Steeltex); (3) insulate the entire house, sidewalls and attic with Ful-Thik Johns-Manville rock wool insulation batts; and (4) use J-M Steeltex as a plaster base for interior walls and ceilings.

Features Ready-Mix

WARNER CO., Philadelphia, Penn., and Wilmington, Del., is prominently mentioned in newspaper stories on a new pre-fabricated home erected in Wilmington. The building itself is steel frame with asbestos-cement siding and roof. The Warner Co. furnished ready-mixed concrete for the basement walls.

New Plant

NORTHERN CEMENT PRODUCTS CO., Petoskey, Mich., recently started operations in a new 30x80-ft. plant at Darlings Corner. Norman Feather is manager. All types of block, mixed with sand and gravel, and cinder, concrete are made, using a high speed, automatic Besser stripper. The company produces its own sand and gravel.

Products Plant for Honolulu

HAWAIIAN HUME CONCRETE PIPE CO., Honolulu, H. I., Marcus K. Billson, manager, has purchased complete equipment for a concrete building products plant, including a Besser Super Automatic plain pallet stripper, capacity 6½ molds per minute, a Besser 50-ft. mixer and accessories. This is the third Besser equipped concrete products plant to be set up in Honolulu.

Enlarging Plant

L. A. WARREN AND CO., Nashville, Tenn., will have completed modernization of its concrete products plant in about 30 days, with installation of about $20,000 worth of equipment built by the Multiplex Concrete Machinery Co., Elmore, Ohio. One power press and one power tamper remain to be installed and an office building and kiln will be erected. Products manufactured are precast joists, concrete laundry trays and concrete blocks.

New Products Plant

MASON TILE MANUFACTURING AND CONSTRUCTION CO., Manchester, Tenn., has established a new concrete block plant in Woodbury, Tenn., having a capacity of about 800 block per day.

New Ready-Mix Plant

T. T. WILSON CO., Chattanooga, Tenn., is building a $25,000 ready-mixed concrete plant. L. H. Godfrey is president.

Black Top Plant

STANDARD SLAG CO., Newcastle, Penn., is building an Amiesite black-top plant.

To Produce Gypsum Rock

A. R. ENO, Fort Dodge, Ia., contractor, has begun development of a strip-mining operation on his property east of the city, to produce and market crude gypsum rock. The operation will require 50 to 58 ft. of overburden removal to quarry 20 to 24 ft. of gypsum. A dragline will be used for stripping. A crushing plant will be built.

A. F. of L. Union Wins

RIVERSIDE PORTLAND CEMENT CO., Crestmore, Calif., plant was the scene of a recent struggle between C. I. O. and A. F. of L. unions; the A. F. of L. came out on top. The management closed the plant when a group of C. I. O. union members walked out on April 27. On April 29 the A. F. of L. union members demanded the plant be reopened. On May 3 the plant was reopened with 400 of the 600 employes back. The C. I. O. called a second strike and only 25 men responded. On May 18, the company signed a closed-shop agreement with the A. F. of L. union which is reported locally to provide for a 40-hour week of five 8-hour days, vacations with pay, seniority rights, an increase in wages. The union agreed to accept as members all employes who apply, and company agreed to require union membership as a condition of employment after 15-days for men now working and after 30-days for those who may be hired subsequently. The company retained the right to hire and fire, being the sole judge of the competency of its employes. The agreement is for one year. Other provisions according to news reports are:

Regular working hours will be no more than 8 per day, or 40 per week. Additional work will be paid for at the rate of time and a half, and an extra hour will be granted to employes each time they are called from their homes for emergency work.

Wages or salaries of employes shall not be reduced if the company asks them to take a temporary job of lower paying nature. In all cases employes will receive the higher rate of compensation when asked to take a temporary job paying higher wages or salaries, it is stated. Temporary work is considered anything less than two weeks for an hourly man, anything less than one month for a salaried employe.

Employes must be notified at least 12 hours before shift if they are not needed, or be given a minimum of 4 hours work at regular wages.

"In promotions, in lay-off and in rehiring, seniority rights shall prevail in each department as a general principle," the agreement continues, "but the company shall in addition consider ability, efficiency, family status, established residence and job requirements."

Hourly employes having a year or more of seniority will be entitled to one week's vacation at regular rates of pay for 40 hours. The previous policy in regard to monthly men will continue.

Safety committees will be appointed in both the mine and mill consisting of union men employed there to discuss and then to submit remedies for any unsafe working conditions to the grievance committee. The grievance committee shall present any employe dissatisfactions to the proper company officials.

A general increase of $12 per month for all men being paid up to $165 per month was ordered effective May 15 and $8 for all those over. Top hourly wages are $1.12 for turbine operators, and $1.05 for burning, electric shop and boiler shop foremen and electric foremen in the mine. Hoistmen and level bosses in the mine and carpenter shop foremen get $1.02. Raw operators, shovel or crane operators and yard foremen get $1.

Lowest hourly wages paid are 62½ cents with the majority at 72½ and 78½ cents. The only division where piece work is mentioned is the sack house where $1.50 per 100 is paid to sewers; 41 cents per 100 for patchers; 12 cents per 100 for sorters; and 83 cents per 1000 for tyers.

Enters New York Markets

CALAVERAS CEMENT CO., San Andreas, Calif., has entered the New York City market with its white portland cement. John A. McCartly & Co., New York, recently ordered three cars. The company's president, William Wallace Mein, well-known mining engineer, is in Europe, where he will spend three months studying cement plants in search of the latest technical advances.

Advertising Manager

UNITED STATES GYPSUM CO., Chicago, Ill., has appointed Frank R. Babcock advertising manager. For the last eight years, Mr. Babcock has been advertising manager of the Nash Motors Co., Kenosha, Wis. He had previously been in the advertising agency business and in the building material field.

To Install Precipitators

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., has contracted with the Western Precipitation Corp., Los Angeles, Calif., for the installation of Cottrell electrical precipitators of 150,000 cu. ft. capacity per minute at the Cape Girardeau, Mo., plant.

Lets Contract

HURON PORTLAND CEMENT CO., Detroit, Mich., has let the contract for a storage and packing plant at Muskegon, Mich., to the Love Construction and Engineering Co., Muskegon, to cost about $100,000.

Correction

UNIVERSAL-ATLAS CEMENT CO., Chicago, Ill., has not opened a sales office in Fairmont, Minn., as was announced on page 69, May issue. The company states that the local report was erroneous.

In Production

WASHINGTON-IDAHO LIME PRODUCTS CO., Orofino, Ida., resumed production April 15. Improvements made during the winter shut-down included an electrically-powered drag scraper for limestone handling, a quarry screening plant, new and larger primary and secondary crushers, additional storage bins, and belt conveyor systems, more than doubling the rock production rate. During previous operations, the company has obtained a portion of the raw material from the Jordan quarry, about four miles from the plant site. Use of Jordan limestone has been discontinued as the new quarry equipment provides ample tonnage of high-grade limestone from the deposit immediately adjacent to the plant. Further plant improvements contemplated have been postponed by reason of heavy spring shipping demands. The plant is at present in production of maximum capacity of about 12,000 bbl. a month. Sales contracts indicate full production for the remainder of the year.

Rock and Slag Wool

NATIONAL ROCK AND SLAG WOOL ASSOCIATION, at its recent annual meeting in Chicago, Ill., elected as president, P. A. Andrews, vice-president in charge of the building materials department of the Johns-Manville Sales Corp. The association was founded at Chicago in 1933 by 16 manufacturers of mineral wool, for the purpose of formulating a code for the elimination of unfair trade practices. Its work consists of collecting statistical data for its members, formulating proper specifications for the installation of rock or mineral wool as insulation, and promoting rock or mineral wool as insulation. Members of the board elected at the Chicago meeting are: H. M. Shirey, president, Standard Rock Wool, Inc.; T. C. Carter, vice-president, Eagle-Picher Sales Co.; Robert F. Fahy, manager, insulation division, Standard Lime and Stone Co.; Jan S. Irvine, sales manager, industrial and structural products division, Owens-Illinois Glass Co.; and John G. Cella, executive vice-president, General Insulating and Mfg. Co.

THE INDUSTRY

New Incorporations

Sievers Sand and Gravel Corp., Elizabeth, N. J.; $50,000. Agent, Christopher Sievers, Jr.

Summit Sand and Gravel Co., Akron, Ohio. Incorporators are George A. Trenner, I. J. Remark and A. R. Remark.

Muskogee Gravel Co., Muskogee, Okla.; capital stock, $50,000. Incorporators are E. R. Jones, and V. L. Bernard.

All Florida Sand Co., Orlando, Fla.; 100 shares, no par value. Incorporators are G. B. Fishback, Mary Terhume and J. Sleigh.

Page Co-operative Lime Association, Inc., Luray, Va.; nonstock corporation, to do a co-operative marketing business. C. E. Musselman, president.

Marblestone Quarries, Lannon, Wis.; to deal in stone and stone products; 50 shares at $100 each. Incorporators are E. Orlow, J. T. Thompson and A. P. Fritsch.

Malvern Sand and Gravel Co., 14 N. Clinton St., Chicago, Ill.; 1000 shares par value at $100 per share. Incorporators are A. E. Seigrist, W. W. Kriebel, Jr., and R. C. Kewley.

Sunnyside Quarry Co., Inc., 19 Brooks Ave., Quincy, Mass.; 100 shares, common, no par value. Incorporators are Olimpio Musette, Ida Musette, Adeline Musette and Oliver Musette.

Doyles, Inc., Milwaukee, Wis.; to deal in molding sand, core and silica sands and petroleum products; 1000 shares at $1 each. Incorporators are Eric William Passmore, Chas. H. Galin and Christine Radermund.

Columbia Mineral Wool Co., Inc., 9 S. Clinton St., Chicago, Ill.; to deal in mineral wool, its products, etc.; 10 shares, par value common, at $100 per share. Incorporators are F. B. Upham, Jr., J. H. Phelan and R. Drews.

The Anderson County Lime Crushing Association, Lawrenceburg, Ky.; non-stock. Incorporators are A. J. Rice, J. D. Smith, W. N. Edmondson, Guy Sweeney, C. M. Cornish, L. Thomas, Joe Gordon, Joe Sparrow and Elijah Leathers.

Comolli Granite Co., Elberton, Ga.; to quarry granite, marble and other stones and minerals; capital stock, $100,000, of which 10% is paid in, divided into shares of $100 each. Incorporators are B. F. Coggins, C. Comolli and Felix Comolli.

Wisconsin Lannon Stone Corp. of Illinois, Northbrook, Ill.; 100 shares, no par value, common. Incorporators are Kennet R. Gregory, C. G. Dederick and R. K. Dower. Correspondent: C. T. Corporation System, 208 S. La Salle St., Chicago, Ill.

Lake Michigan Gravel, Inc., Winthrop Harbor, Ill.; mining and reclaiming of sand and gravel from shore bed of Lake Michigan; 200 shares, par value common at $100 per share. Incorporators are R. R. Cowie, L. A. Needham, Leslie A. Needham.

D. McHolland & Sons, Inc., 1620 Mulberry St., Harrisburg, Penn.; to deal in stone and granite; capital stock, $10,000. Incorporators are Robert H. Mathias, Colonial Park, William P. McHolland, Camp Hill, and John R. Hood, 2640 N. 2nd St., Harrisburg.

Lake Washington Gravel Co., of Greenville, Miss.; to deal in sand and gravel; authorized capital, $5000 of common stock of par value of $50 per share. Incorporators are J. H. Whigham, Montgomery, Ala., and Leslie Lyon and A. M. Arpin, Greenville, Miss.

Lacey Asphaltic Limestone Co., Birmingham, Ala.; to deal generally in asphalt, gravel, chert, sand and ores; total capital stock, $10,000, divided into 100 shares of $100 par value each; paid in, $2500. Incorporators are R. L. Lacey, A. J. Robins and D. Q. Connable.

Monticello Quarries, Inc., Washington, Penn.; to deal in stone; $100,000. Incorporators are Harry B. Monticello, D. I. McAlister and George H. Krause.

Certified Concrete, Inc., 555 Southern Ave., Muskegon, Mich.; paid in capital $3000. Incorporators are S. H. Markle, Everett L. Jones, Jr., and H. M. Blackburn.

Wood River Sand and Material Co., 21 East Ferguson, Wood River, Ill.; to deal in sand and gravel in construction of buildings, pavings, dams, etc.; 400 shares of $10 par value. Incorporators are A. W. Gerson, W. Daugherty and F. K. Gerson.

Washed Sand and Gravel Co., Salem, Ore.; to engage in wholesale and retail gravel business. Proprietors are Lowell M. Lambert, Clarence E. Woosley and Howard A. Jones.

Memorial Stone Co., De Kalb county, Decatur, Ga.; to deal in granite, crushed stone, etc.; capital stock, $6000, divided into 60 shares of $100 each. Incorporators are Fred C. Mason, Guy W. Rutland and Scott Candler.

Personals

Paul T. Beard has recently been appointed superintendent of the Modern Sand and Gravel Co., Pacific, Mo.

Charles Warner, Jr., was, on April 26, elected a director of the Warner Co., Philadelphia, Penn., succeeding H. F. Brown.

A. H. Ingley of the Standard Portland Cement Co., Painesville, Ohio, has been named to head the Painesville Chamber of Commerce for 1937.

R. N. Coolidge, Cumberland River Sand Co., Nashville, Tenn., was recently nominated for election to the board of governors of the Nashville Chamber of Commerce.

Benjamin F. Affleck, former president of the Universal Atlas Cement Co., Chicago, Ill., has been elected to the board of directors of the Transportation Association of America.

Hans Mumm, Jr., Everett, Wash., has been appointed engineer for the Snohomish county utility district. Mr. Mumm is president and general manager of the Everett Concrete Products Co.

Franklin Osborn, superintendent of the crushing plants of the Andes Copper Mining Co. at Potrerillos, Chile, is spending his vacation at his home on Walnut Road, East of Main, Vineland, N. J.

Francis E. Field, superintendent of the Asheville Mica Co., spoke at a meeting of the Civitan Club, Asheville, N. C., April 28, on the development of the mica industry in Western North Carolina.

Rodney Kauffman, advertising and credit manager of the Southwestern Portland Cement Co., addressed the members of the Fairfield-Osborn Rotary Club at a meeting April 21 at Osborn, Ohio. His topic was "Advertising".

A. H. Hinkle, director of the Kentucky Rock Asphalt Institute, broadcast an address on "The Cost of Kentucky Rock Asphalt" over Station WHAS on March 21, at 6:15 p.m., C.S.T. He gave comparative costs with other road materials.

W. F. Mackenzie, formerly chief chemist for the Southwestern Portland Cement Co. at El Paso, Texas, and Osborn, Ohio, and for the past seven years assistant to the general manager of the Pretoria Cement Co. of South Africa, has returned to the United States and is seeking a connection. He is at Thorndike, Mass.

C. G. Dandrow, manager of the metropolitan power products division of Johns-Manville Corp., gave a lecture, illustrated with moving pictures, before local chapters of the Society of Professional Engineers at Kingston, N. Y., April 22, on the uses and availability of pipe of cement and asbestos construction in water mains.

W. C. Slee of Baltimore, Md., has been appointed assistant engineer-director of the American Road Builders' Association.

Samuel M. Gloyd, president of the Texas Cement Plaster Co., Oklahoma City, Okla., was married at Chicago, Ill., March 20, to Miss Onez Norman. The couple sailed on the "Normandie" for England, where they will attend the coronation rites; then they will continue on a cruise around the world.

Murray D. Shaffer, resigning as service-safety director of Mansfield, Ohio, has accepted an engineering position with the Portland Cement Association at Lima, Ohio. Mr. Shaffer is a graduate of Ohio university with a degree in civil engineering and has worked for the Pennsylvania railroad and in other engineering capacities.

Hubert Grose of Leadwood, Mo., owner and operator of a gravel plant on Big river at Highley Ford, late in March suffered an injured left arm and hand, when he was knocking ice off with a stick and slipped and caught his arm in the conveyor pulley. Despite the injury, he is able to look after the management of the plant, which was recently remodeled and enlarged.

Herbert L. Oakes has been appointed district representative for the Lehigh Portland Cement Co. in Kansas and Oklahoma. Mr. Oakes received his B.S. in civil engineering from the University of Oklahoma in 1926 and was formerly affiliated with the Kansas state highway department, during which employment he prepared a construction manual outlining the procedure for state highway work in Kansas.

Obituaries

Clifford S. Randall, 71, vice president and treasurer of the Portland-Monson Slate Co., Portland, Maine, died April 21.

Albert H. Gilbert, 53, general mill foreman of the Hawkeye Portland Cement Co., Des Moines, Iowa, died April 23 after three weeks' illness.

Robert V. Norris, 70, who operated the White Ridge stone quarry near Colorado Springs, Colo., for many years, died April 25, after a five months' illness.

Calvin Burr Beach, 74, for many years an executive of the Midland Terra Cotta and Wisconsin Granite companies, died at his home in Chicago, Ill., April 26.

Richard Irving Stearns, 90, retired president of the Stearns Lime and Stone Co., died May 3 at his home in Chicago, Ill. He was active in the business until about a year ago.

David M. Kirk, 76, former president of Crescent Portland Cement Co., died May 18 at his mansion in Sewickley Heights, near Pittsburgh, Penn. He had resigned his position with Crescent in 1928.

John Shaffer Lutes, 63, former city director of Pasadena, Calif., and active head of the Eaton Canyon Rock and Sand Co., East Pasadena, Calif., fell dead in his office May 5. He was a graduate in engineering from the University of Pennsylvania and had worked for 33 years in the iron range district of Northern Minnesota.

Walter B. Brooks, Jr., 52, president of the Arundel-Brooks Concrete Corp., Baltimore, Md., died suddenly March 25 of heart disease. He served during the World War in an engineering unit of the United States Army in France, with the rank of captain. He became president of the concrete corporation about five years ago, at the time of its organization.

William Waldron Hanold, 87, died in Brooklyn, N. Y., May 2. For 64 years he had been an employe of the Johns-Manville Corp. and had watched the concern grow from a tiny one-room office to its present size. Serving by turns as office assistant, shipping clerk, advertising manager, salesman and contract manager, Mr. Hanold in recent years was known as the company's librarian and historian.

Roscoe Crary, officer and stockholder in the Haywood Lumber and Mining Co., which owns the Big Ridge Mica Mine on Lickstone mountain, N. C., died in Chicago, Ill., April 2.

S. G. Tunstill, foreman of the asphalt plant of the Independent Gravel Co., Webb City, Mo., and an employe of the company for many years, died suddenly April 3. He was about 45 years old.

Chas. Edward Heath, 65, vice-president and general manager of Fate-Root-Heath Co., Plymouth, Ohio, died May 18 after an illness of several months. He had joined the original firm of Root Bros. in 1890.

William Peterson, 69, Eagle Lake, Minn., died March 21 after a stroke. Mr. Peterson was in the cement and concrete business in Willmar, Minn., for 31 years before he came to Eagle Lake about 20 years ago.

W. H. Giltner, 66, a director and one of the organizers of the Ohio Valley Rock Asphalt Co., Louisville, Ky., died of a heart attack April 6. He was chairman of the executive committee of the company, which was organized 25 years ago.

David Hyman, 76, for years prominent in the sand and gravel business in Buffalo, N. Y., died March 23 in San Francisco, Calif., where he was spending the winter. Former president of the Buffalo Gravel Corp., he was, at the time of his death, vice-president of the Empire Limestone Co. and also a director of the Genesee & Wyoming railroad. He was a member of the American Society of Mechanical Engineers.

George E. Nicholson, 76, pioneer in the cement industry and president of the National Cement Co., Birmingham, Ala., and of the Georgia Cement and Products Co., Atlanta, Ga., died at Atlanta April 9. He had been in ill health for a number of years but was active until last fall. He organized companies and built cement plants in Kansas City, Mo., Des Moines, Iowa, and Richard City, Tenn. In 1920 he bought a cement plant at Ragland, Ala. He was former president of the Kansas City Gas Co. and well known in that city. Prior to entering the cement industry, Mr. Nicholson was a zinc manufacturer at Nevada, Mo., and Iola, Kan., also building smelters at Tulsa and Henryetta, Okla. Burial was in Kansas City.

Crushed Stone

Omaha, Neb.: The city has installed a rock crusher brought from Weeping Water on a rental-purchase basis.

Alfred C. Clatt, Memphis, Mo., recently opened a limestone quarry on the Thos. Wells property near the Hilbrant bridge.

Ottumwa, Iowa: Two new WPA quarries were opened recently—one near Dudley, and the other in Keokuk county near Hedrick—to produce material for Wapello county roads.

Somerset, Ky.: The Kentucky state highway department is operating the Tateville rock quarry to produce material for blacktopping the Parkers Lake-Cumberland Falls Highway.

Coffeyville, Kan.: A WPA quarry has been opened on the Floyd ranch, three miles north of Sedan. A crusher has been installed to produce material for surfacing the Sedan-Monett road.

Jack Roth, St. Paul contractor, recently installed crushing and screening equipment costing $16,000 at Flood bay, to produce material for resurfacing Highway 61 between Two Harbors and Beaver Bay, Minn.

Arlington, Wash.: The Arlington Heights rock quarry has been enlarged by the purchase of an additional 8 acres, making the county quarry 14 acres in size. The material in the quarry is suitable for river bank protection projects.

West Union, Iowa: Fayette county has purchased a new rock crusher and has set it up on the O. S. Hough limestone quarry east of town. The material produced will be used to resurface the West Union-Elgin road to which the quarry is adjacent.

Limestone Products Corp., New York City, has moved its office to 9 Rockefeller Plaza.

Oxford, N. C.: The town has purchased a portable rock crusher and is preparing stone for placing on unpaved streets.

Bloomfield, Iowa: Work was recently resumed at the Davis county rock quarry, under WPA, after a short layoff.

Seneca, Kan.: WPA has opened a new rock quarry on the McBride farm south of Seneca. The rock will be used for a Center township highway.

Tipton, Mo.: The county crusher, which has been located on the Mrs. Mary Dueber farm since last May has been moved to a location near High Point.

Tobin Quarries have opened an office in Nehawka, Neb., in the east room of the old bank building. Work at the quarry west of town has been resumed.

Pawnee City, Neb.: A new quarry has been opened by WPA four miles east of Pawnee City. The rock will be used on a stretch of road leading from Highway No. 4.

Nathan R. Scott, Georgetown, Ohio, former Brown county engineer, has purchased a stone quarry near Danville, Ohio, known as the John Cashman quarry and is putting it into operation.

Fred Hurst of Hurstville, Iowa, has moved his rock crusher to Rockville, north of Maquoketa, Iowa, and is engaging in the preparation of rock products. His plant will be operated by electricity.

Wellsville, Mo.: Montgomery county recently purchased a rock crusher and is producing material for county roads under a WPA project. The county also bought a road grader and a Diesel tractor.

Kentucky Stone Co., Louisville, Ky., has been awarded contract for furnishing crushed rock for the surfacing of the Leitchfield road, and production of this material has begun at its Irvington, Ky., quarry.

Oroville, Calif.: A WPA rock crushing project has been operated on the C. H. Thurman property in the River district in conjunction with the county road department. Operations, it is said, continued until the middle of May.

Fred Osborne of Lee county, Iowa, has installed stone crushing machinery on the quarry on the C. S. Stebbins farm across the river from Bonaparte, Iowa. C. S. Stebbins has orders for more than 1000 tons of commercial limestone.

Southwestern Construction Co., which opened two new gravel pits south of Red Oak, Iowa, last year, has begun quarry operations on a large scale at the Stennet rock quarry. A new crusher and pulverizer and a new dragline have been purchased.

Le Beau Bros., New London, Wis., have set up crushing equipment, and the Mukwa quarry south of town is producing agricultural limestone. Although no WPA labor is available, the price has been advanced only 25c a ton. Le Beau Bros. are coöperating with the county agent's office in Waupaca.

Spring Hill, Kan.: The city council has voted to purchase a small rock crusher in order to produce material for city streets. The city secured crushed rock from the county crusher until a ruling was passed that rock crushed at the county quarry must be used on county and township roads.

Sand and Gravel

Roy Drummond, Austin, Minn., has leased the Corneveaux sand and gravel tract and is operating a sand and gravel business. He has contracts for sand for several school houses.

Sylacauga, Ala.: Road contractors have found gravel on the property of J. W. Brown and Hightower Brothers, and gravel production—a new industry for this vicinity—is under way.

Miscellaneous

Asheville Mica Co., Sylva, N. C., recently erected a warehouse extending close enough to the Southern Railway track for convenient loading of mica for shipment to the Asheville plant.

Manufacturers

Blaw-Knox Co., Pittsburgh, Penn., has acquired the property and business of the Power Piping Co. of Pittsburgh.

Bucyrus-Erie Co., South Milwaukee, Wis., announces change of street address of F. H. Hopkins Co., Ltd., distributor, to 340 Canada Cement Bldg., Phillips Square, in Montreal, Quebec, Canada.

Wickwire-Spencer Steel Co., New York, N. Y., has promoted D. J. Henecker to manager of the wire rope sales department, succeeding R. H. Cherry, deceased. Mr. Henecker was associated, from 1921 to 1932, with American Steel & Wire Co. Before his promotion he was manager of Wickwire-Spencer's Buffalo district.

Oliver United Filters, Inc., announces appointment of L. W. Knapp to its sales engineering staff at the New York office.

Patterson Foundry & Machine Co., East Liverpool, Ohio, announces opening of its Pittsburgh office, located in the Bessemer Bldg. D. M. Wilhelm is in charge.

Tractor & Equipment Co., Chicago, Ill., announces that W. D. Ball, Ottawa, Ill., recently joined its organization as district representative in La Salle and adjoining counties in Illinois.

Air-Maze Corp., Cleveland, Ohio, has appointed W. G. Heacock its Michigan factory representative. His headquarters will be at the office of Barton D. Wood Co., Inc., 2832 East Grand Blvd., Detroit, Mich.

American Steel Dredge Co., Ft. Wayne, Ind., has added William D. Kinnaird of Indianapolis, Ind., to its staff as sales engineer. Mr. Kinnaird was associated with Hetherington & Berner, Inc., for nine years.

Bucyrus-Erie Co., South Milwaukee, Wis., announces that its Seattle office is now located at 3408 First Ave., South, Seattle, Wash. James W. Bell of Cedar Rapids, Iowa, has been appointed the company's new distributor in Iowa.

Tractor & Equipment Co., Chicago, Ill., has transferred "Al" Spicer from the Rockford, Ill., vicinity to Peoria, Ill. J. C. Snyder has joined the Tractor & Equipment Co. in the capacity of district manager, with headquarters at Springfield, Ill.

Foote Bros. Gear & Machine Corp., Chicago, Ill., reports that F. A. Emmons, its vice-president and general sales manager, recently returned from a trip through Texas and Oklahoma for a survey of field conditions and reports a favorable outlook for the sale of oil well pumping equipment.

Linde Air Products Co., unit of Union Carbide and Carbon Corp., New York, N. Y., announces the opening of a new Prest-O-Lite acetylene plant at 2330 Armistead Bridge Road, Norfolk, Va. The company has also opened a new oxygen plant on Powhattan Ave., Essington, near Philadelphia, Penn.

Easton Car & Construction Co., Easton, Penn., announces that Charles Abeles has recently joined its sales organization, with his headquarters in the New York office. Mr. Abeles was formerly with Koppel Industrial Car & Equipment Co. as assistant sales manager in the eastern district, domestic and export.

Ransome Concrete Machinery Co., Dunellen, N. J., announces appointment of the following firms to handle its line of equipment: Brown-Strauss Corp., 1402 Guinotte Ave., Kansas City, Mo.; Shovel Supply Co., 1302 McKinney Ave., Dallas, Texas; Highway Equipment Co., 1359 Earnst St., Cincinnati, Ohio; Contractors Machinery & Supply Co., 200 E. Eleventh St., Chattanoogn, Tenn.; Dakota Tractor & Equipment Co., 301 N. P. Ave., Fargo, N. D.; and H. B. Faith Equipment Co., 2724 Auburn St., Rockford, Ill.

Gar Wood Industries, Inc., Detroit, Mich., announces appointment of Stanley E. Chase, who for the last four years has been connected with the sales department, to manager of the company's air conditioning division branch at Rochester, N. Y. S. T. Smith, former branch manager at Rochester, has been transferred to Boston, where he succeeds E. H. Band as branch manager. The company was awarded a bronze plaque by the Jury of Awards during the National Oil Burner and Air Conditioning Exposition held recently in Philadelphia.

Wellman Engineering Co., Cleveland, Ohio, has acquired exclusive right, under the U. S. patents of Albert L. Galusha, to manufacture and sell, in this country, the Galusha gas generator, which produces a high-grade industrial gas from small anthracite coal, or coke-breeze, at a very low cost. Mr. Galusha will be associated with the Wellman organization as chief engineer of the "Wellman-Galusha Gas Equipment," with headquarters at 30 Church St., New York City. Bulletin 95, 12 pages, describing the new clean gas generator, is available on request.

American Welding Society, New York, N. Y., has appointed Warner S. Hays as managing director.

Cutler-Hammer, Inc., Milwaukee, Wis., has opened a new sales office at 624 Santa Fe Bldg., Dallas, Texas.

The Cleveland Tractor Co., Cleveland, Ohio, has appointed Paul C. Nordloh as advertising manager.

C. O. Bartlett & Snow Co., Cleveland, Ohio, has moved its New York City office to Room 404-E, 30 Church St.

Wickwire Spencer Steel Co., New York, N. Y., announces that the trusteeship under which it has been operating is dissolved.

Lincoln Electric Co., Cleveland, Ohio, announces appointment of Don McCormick as arc welding consultant for the Kansas City, Mo., office.

Equipment Corp. of America, Chicago, Ill., has completed a new, all steel, fireproof warehouse and office building at its Pittsburgh, Penn., plant.

The Kentucky Rock Asphalt Institute, Louisville, Ky., has selected George Hubard Massey as its Washington, D. C., District of Columbia and Maryland representative.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Penn., announces election of John W. White as vice-president and general manager of the company, with headquarters in New York City.

The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio, announces that Robert S. Hale, 1008 Atlas Bank Bldg., Cincinnati, Ohio, submitted the first paper in competition for its $200,000 awards.

Sullivan Machinery Co., Claremont, N. H., announces that John C. Curtis, formerly chief engineer of the Cleveland Rock Drill Co., has joined the engineering staff of its rock drill division, succeeding Arthur R. Hosking, who has been made assistant manager of the division.

Patterson Foundry & Machine Co., East Liverpool, Ohio, has announced a comprehensive plan to double its production facilities within the next two years. As an initial step, additions to the machine and fabricating divisions have increased capacity of these two departments 50%.

Traylor Engineering & Manufacturing Co., Allentown, Penn., has appointed the Canadian Fairbanks-Morse Co., Ltd., of Montreal, Toronto, Quebec and twelve other offices in Canada as selling agent for Traylor equipment in Newfoundland and all of Canada except British Columbia.

Taylor-Wharton Iron & Steel Co., has appointed William G. Hulbert as general works manager in charge of manufacturing at both its Easton, Penn., and High Bridge, N. J., plants. H. F. Heyl, formerly chief engineer at the Easton plant, succeeds Mr. Hulbert as superintendent at Easton.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has opened an office in the National Bank Bldg., Knoxville, Tenn., to operate as a branch of the Chattanooga district office. W. C. Johnson is in charge at Knoxville. The company has promoted C. C. Jordan, for the past 10 years sales engineer in the steam turbine division, to assistant manager of that division.

Johns-Manville Sales Corp., New York, N. Y., announces appointment of Arthur S. Elsenbast, manager of the filter aids and filler department, as vice-president. Mr. Elsenbast was manager of the filtration and development department for the Celite Co., producer of diatomaceous earth products, until this firm was purchased by Johns-Manville in 1928.

The Black & Decker Mfg. Co., Towson, Md., announces appointment of John M. Schreiner as manager of the Detroit branch, succeeding the late George W. Stoiber. Mr. Schreiner has been active in the Detroit area for the last twelve years. W. J. Fenwick has been promoted to manager of all activities in the Cleveland territory. G. H. Treslar has been appointed supervisor of the Detroit and Cleveland territories.

Lubrication Movies

SOCONY-VACUUM OIL CO., INC., New York City, recently invited a group, including a ROCK PRODUCTS' representative, to a preview of a new educational talking movie to demonstrate the fundamentals of "correct lubrication"—entitled "The Inside Story."

The film showed many types of bearings, such as those in crushers, pulverizers, conveyors, screens, elevators, Diesel engines and other heavy duty equipment used in all industries, with especial attention to gears and cylinders. The film showed the results of friction when two highly polished surfaces move on each other. It showed photomicrographs enlarged until they covered the whole screen, clearly exhibiting the reasons for the friction; the fact that the highly polished parts are not really as smooth as they appear to be; that their surfaces are actually covered with tiny hills and dales which the unaided eye cannot see. In short, the film depicted just what goes on inside of a working machine and how lubrication prevents metal from ruining metal.

The motion picture was accompanied by what is commonly called "an overlay voice"—an unseen lecturer who explains each step in simple non-technical language. Six months were required for the making of the film, which was produced by Caraval Films, Inc. The production was under the direction of P. M. Gordon, manager of the industrial division of the lubricating department of Socony.

Social Service

MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., is building at its Cape Girardeau, Mo., plant a beautiful reinforced-concrete natatorium, including a swimming pool, for its employes. The building and equipment is the gift of W. Woodbridge Dickinson, vice-president, of the company, as a memorial to his late father, Wm. Dickinson, one of the founders and for many years president of the company. The structure includes spacious locker rooms, shower baths, etc.

The Cape Girardeau plant was recently the scene of a very pleasant ceremony when the 409 employes presented Richard Moyle, Sr., vice-president in charge of operations, with a beautiful silver plaque, as a tribute "in appreciation of his true friendship and constant loyalty." It bears the engraved signature of every employe of the plant.

Mr. Moyle acquired his concern for the working man's welfare through toil with his own hands in the copper mines of Michigan, in the coal mines of Oglesby, as a stable boy in New York for a time after he came to these shores from South of England, as a tracklayer with a Burlington Railroad "section" gang, as a laborer in the early days of Oglesby's cement industry. That concern he has exercised throughout the years he has dealt with men and they appreciate it.

Richard Moyle, Sr., and the silver plaque presented to him by the employes of the Cape Girardeau plant of Marquette Cement Co.

Besides Mr. Moyle, others present when the plaque was tended him on behalf of the employes by James Greer, safety engineer, Cape Girardeau, were Frank Moyle, superintendent of the Oglesby plant; Walter Wecker, Chicago, president of the company; Leonard Saxby, Chicago, assistant to the president, Harry Cole, superintendent, Cape Girardeau plant; Robert Matthews, assistant to Mr. Cole and others.

In making the presentation, Mr. Greer said in part: "Mr. Moyle, our men here at the Cape Girardeau plant have asked me to express for them their deepest appreciation for the many things you and the company have done for them during the many years we have had the pleasure of working with you and for you.

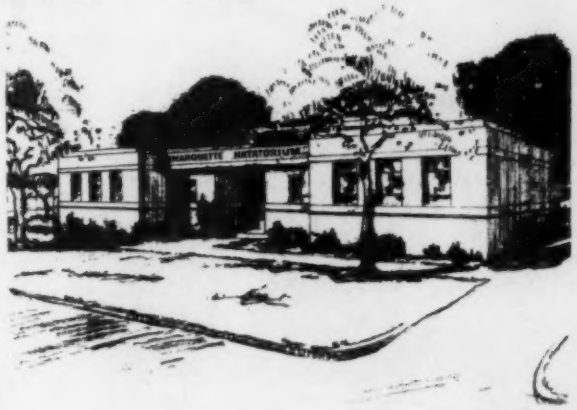
"We know it to be a fact that our troubles are your troubles and our joys are your joys.

"You have shown us in many ways that our health, safety and welfare is uppermost in your mind. You have been our dearest friend and your unfailing loyalty is indeed a cardinal virtue.

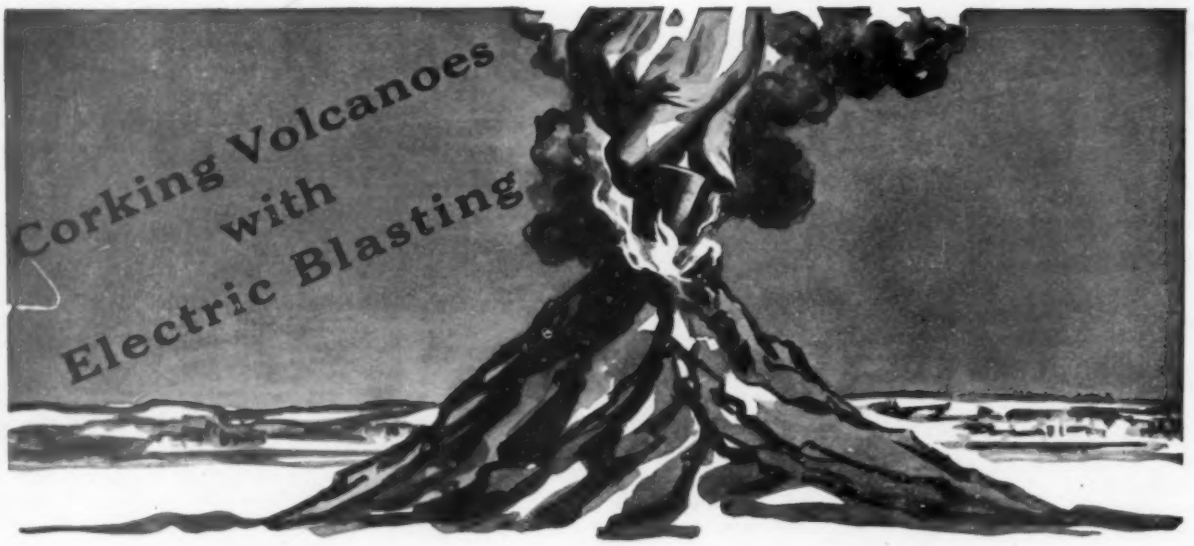
"We have very little opportunity to show you how much we really appreciate what you have done for us except to do our very best in our daily work and return your friendship and loyalty with our own friendship and loyalty to you and to the company.

"Among the many fine things you and the other officials have done for us, we feel that one of the most impressive gestures in our behalf that has ever been made occurred last Christmas, Mr. Moyle, when you personally handed each of us a wonderful Christmas present, shook our hands and wished us a Merry Christmas and a Happy New Year.

"Following this fine demonstration of your interest in our welfare, the employes of this plant, of their own free will and accord, decided it was time to try to show in some small way that everything you have done for them has been deeply appreciated. Each employe contributed his or her small part and a substantial sum was raised. A committee was appointed to select something appropriate, something which would please you and at the same time demonstrate our deep regard for you. To our minds, the committee made a very wise selection, for their choice was something that you could never obtain in any other manner except through the employes of this plant."



Architect's drawing of natatorium being built for employes of Marquette Cement Co. at Cape Girardeau, Mo.



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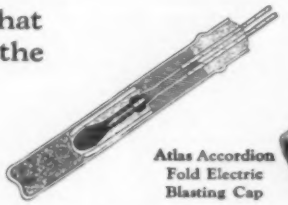

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Hercules Powder Co.

Blasting Supplies
Atlas Powder Co.
Hercules Powder Co.

Blasting Powder (See Powder, Blasting)

Block Machines, Building
Anchor Concrete Machinery Co.
Besser Mfg. Co.
Miles Mfg. Co.
Multiplex Concrete Machy. Co.
Stearns Mfg. Co.

Block Machines, Silo
Besser Mfg. Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Blowers
W. W. Sly Mfg. Co.

Bodies (Car & Motor Truck)
Hug Company

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Belts
Standard Pressed Steel Co.

Boots and Shoes
B. F. Goodrich Co.

Breakers (Primary)
Smith Engineering Works
Traylor Engineering & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Brick Machines
Besser Mfg. Co.
Multiplex Concrete Machy. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Geo. Haiss Mfg. Co., Inc.
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.
Owen Bucket Co.

Buckets (Dragline and Skackline)
American Manganese Steel Co.
Blaw-Knox Co.
Bucyrus-Erie Co.
Owen Bucket Co.
Page Engineering Co.
Pioneer Gravel Equip. Mfg. Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dredging and Excavating)
Geo. Haiss Mfg. Co., Inc.
Harnischfeger Corp.
Owen Bucket Co.

Buckets (Elevator and Conveyor)
Chain Belt Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
Robins Conveying Belt Co.
Taylor-Wharton Iron & Steel Co.

Bulldozers
Blaw-Knox Co.
Koehring Co.

Cableways
Broderick & Bascom Rope Co. (Yellow Strand)
Link-Belt Co.
John A. Roebling's Sons Co.
Sauerman Bros.
Wellman Engineering Co. (G. H. Williams)
Williamsport Wire Rope Co.

Calcinators
Bradley Pulverizer Co.
Traylor Engineering & Mfg. Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Calcium Chloride
Calcium Chloride Ass'n

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.
Hercules Powder Co.

Car Pullers
Link-Belt Co.

Carriers
Barber-Greene Company

Cars (Dump)
Carnegie-Illinois Steel Corp.

Cars and Track, Industrial
Besser Mfg. Co.
Chase Fdry. & Mfg. Co.

Cars (Quarry & Gravel Pit)
Carnegie-Illinois Steel Co.

Car Movers (freight)
Appleton-Atlas Car Mover Corp.

Castings
Babcock & Wilcox Co.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Continental Motors Corp.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.
Traylor Engineering & Mfg. Co.

Cement Paints
Tamms Silica Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Blaw Knox Co.
Chain Belt Co.
Jaeger Machine Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.

Chain Drives
Chain Belt Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Chain Belt Co.
Jeffery Mfg. Co.
Link-Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chemicals
Calcium Chloride Ass'n

Chimney Block Machines and Molds
Besser Mfg. Co.
Multiplex Concrete Machy. Co.

Chromium Plating
Worthington Pump & Machy. Corp.

Chutes and Chute Liners
American Manganese Steel Co.
Earl C. Bacon, Inc.
Goodyear Tire & Rubber Co., Inc.

Clarifiers
The Dorr Co.
Hardinge Co., Inc.

Classifiers
The Dorr Co.
Hardinge Co., Inc.
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
Broderick & Bascom Rope Co. (Yellow Strand)
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Hardinge Company, Inc.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Collars (Shafting)
Standard Pressed Steel Co.

Colors, Cement
Geo. S. Mepham Corp.
Tamms Silica Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressed Air Rock Drills
Cleveland Rock Drill Co.
Gardner-Denver Co.
Worthington Pump & Machy. Corp.

Compressors (See Air Compressors)

Concrete Pipe Machinery
Universal Concrete Pipe Co.

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co.

Condensers
Worthington Pump & Machy. Corp.

Consultants on Lime Production
Arnold & Son

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
Barber-Greene Company
C. O. Bartlett & Snow Co.
Chain Belt Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Conveyors and Elevators
Allen Sherman Hoff Co.
Earle C. Bacon
Barber-Greene Company
Besser Mfg. Co.
Chain Belt Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Huron Industries, Inc.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Multiplex Concrete Machy. Co.
Pioneer Gravel Equip. Mfg. Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Open gears *need* the protection of GULF LUBCOTE

. . . a heavy bodied lubricant with remarkable adhesiveness and lasting qualities

HERE is a special petroleum lubricant which is solving gear lubrication problems for many plant operators. Gulf Lubcote combines exceptionally high adhesiveness for metal surfaces with natural high viscosity and efficient lubricating qualities for specific requirements.

Gulf Lubcote effectively cushions gear teeth and resists the wiping action of gears in motion. It retains its original fluidity and high lubricating qualities to a remarkable degree, resisting heat and decomposition.

Use Gulf Lubcote to lengthen the life of your gear-trains and keep them operating without noise. You will be pleased with the results.

FOUR REASONS . . . WHY GULF LUBCOTE IS THE LUBRICANT OF UNPARALLELED QUALITY FOR OPEN GEARS

1 GULF LUBCOTES are heavy bodied products especially manufactured to have the requisite property of high adhesiveness for metal surfaces necessary in lubricants for open gears.

2 Due to selected crudes used and to the process of refinement employed, GULF LUBCOTES possess unusual lubricating qualities together with the essential property of flowing with the movement of the gear and pinion teeth.

3 The lubricating film provided by GULF LUBCOTES, in addition to being impervious to moisture, acid fumes and gases, will withstand extreme temperature changes without deterioration.

4 Due to the tough and tenacious nature of GULF LUBCOTES they will effectively reduce objectionable gear noise and at the same time will provide maximum protection against corrosion, pitting or excessive wear of the gear teeth.

GULF OIL CORPORATION

GULF REFINING COMPANY

GENERAL OFFICES: GULF BLDG., PITTSBURGH, PA.

GULF INDUSTRIAL LUBRICATION

Classified Directory—*Continued*

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyors (Spiral)
Jeffrey Mfg. Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Air Hose)
Cleveland Rock Drill Co.

Couplings (Flexible and Shaft)
Chain Belt Co.
Huron Industries, Inc.
Link-Belt Co.
Standard Pressed Steel Co.

Couplings (Hose, Pipe, etc.)
B. F. Goodrich Co.
Worthington Pump & Machy. Corp.

Cranes (Clamshell)
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Co.

Cranes (Crawler and Locomotive)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Co.
Michigan Power Shovel Co.
Northwest Engineering Co.
Thew Shovel Co.
(Electric, Gasoline & Steam)

Cranes (Excavator)
Koehring Co.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.
Industrial Brownhoist Corp.

Crank Shafts (Finished)
Continental Motors Corp.

Crusher Parts
American Manganese Steel Co.
American Pulverizer Co.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Pennsylvania Crusher Co.
Taylor-Wharton Iron & Steel Co.
Traylor Engineering & Mfg. Co.

Crushers (Hammer)
The C. O. Bartlett & Snow Co.
Carnegie-Illinois Steel Corp.
Day Pulverizer Co., Inc.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co
Jeffrey Mfg. Co.
Pennsylvania Crusher Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Good Roads Machinery Corp.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Lewistown Fdy. & Mach. Co. (Jaw)
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Crushers (Reduction)
Earle C. Bacon, Inc.
Birdsboro Steel Fdry. & Mach. Co.
Bonnot Company
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
Traylor Engineering & Mfg. Co.

Crushers (Ring)
American Pulverizer Co.

Crushers (Roll)
American Pulverizer Co.
Day Pulverizer Co., Inc.
Gruendler Crusher & Pulv. Co.
New Holland Machine Co.
Pioneer Gravel Equip. Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Rotary)
American Pulverizer Co.
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
American Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
New Holland Machine Co.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Sturtevant Mill Co.

Dedusters
Blaw-Knox Co.

Derricks and Derrick Fittings
Harnischfeger Corp.

Detonators
Atlas Powder Co.
Hercules Powder Co.

Diaphragms (Pump)
B. F. Goodrich Co.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
Frog, Switch & Mfg. Co.
Thew Shovel Co.

Dipper Teeth (Manganese)
Taylor-Wharton Iron & Steel Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co.

Ditchers
Barber-Greene Company
Bucyrus-Erie Co.
Harnischfeger Corp.

Draglines
Bucyrus-Erie Co.
Harnischfeger Corp.
Link-Belt Co.
Northwest Engineering Co.
Page Engineering Co.
Thew Shovel Co.

Draglines (Gasoline or Electric)
Koehring Co.

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros., Inc.

Dragline Excavators
Bucyrus-Erie Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Michigan Power Shovel Co.
Northwest Engineering Co.
Page Engineering Co.
Thew Shovel Co.
(Electric, Gasoline & Steam)

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc. (Complete Steel)
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.
Thermoid Rubber Co.

Drill Bits
Timken Roller Bearing Co.

Drilling Accessories
Cleveland Rock Drill Co.

Drill Sharpening Machines
Gardner-Denver Co.

Drill Steel
Cleveland Rock Drill Co.
Gardner-Denver Co.
Worthington Pump & Machy. Corp.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Cleveland Rock Drill Co.
Gardner-Denver Co.
Worthington Pump & Machy. Corp.

Drills (Tripod)
Cleveland Rock Drill Co.

Drills (Wagon)
Cleveland Rock Drill Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.

Dumptors
Dempster Bros., Inc.
Koehring Co.

Dust Arresters
W. W. Sly Mfg. Co.
Western Precipitation Co.

Dust Collecting Systems
Allen Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
The C. O. Bartlett & Snow Co.
Blaw Knox Co.

Dust Conveying Systems
Fuller Company
Western Precipitation Co.

Dynamite
Atlas Powder Co.
Hercules Powder Co.

Electric Cables and Wires
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.

Emery Mills
Sturtevant Mill Co.

Engineers
Bonnot Company
The Dorr Co.
Fuller Co.
Hetherington & Berner, Inc.
Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Engines (Diesel)
National Supply Company
Nordberg Mfg. Co.

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.
Hercules Powder Co.

Fans (Exhaust)
W. W. Sly Mfg. Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Earle C Bacon, Inc.
Besser Mfg. Co.
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc. (Weighing)
Jeffrey Mfg. Co. (Pan & Tube)
Pioneer Gravel Equip. Mfg. Co.
Robins Conveying Belt Co.
Smith Engineering Works (Plate)
Stearns Mfg. Co.
Traylor Engineering & Mfg. Co.

Feeders (Weight)
Schaffer Poidometer Co.

Filters (Air)
W. W. Sly Mfg. Co.

Filters (Dust)
W. W. Sly Mfg. Co.

Forges (Oil)
Gardner-Denver Co.

Forgings
Continental Motors Corp.
Taylor-Wharton Iron & Steel Co.

Frogs and Switches
Taylor-Wharton Iron & Steel Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.

Gasoline
Socony-Vacuum Oil Co. Inc.
Texas Company

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Gears and Pinions
Chain Belt Co.
Link-Belt Co.
Taylor-Wharton Iron & Steel Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples
Blaw Knox Co.
Hayward Co.
Owen Bucket Co.

Grease
Gulf Refining Co.
Socony-Vacuum Oil Co. Inc.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp.
Jeffrey Mfg. Co.

Grizzlies
American Manganese Steel Co.
Jeffrey Mfg. Co. (Vibrating)
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Engr. & Mfg. Co.

Hammer Drills
Cleveland Rock Drill Co.
Gardner-Denver Co.
Worthington Pump & Machy. Corp.

Hammer Mills (See Crushers)

Hoists
Gardner-Denver Co.
Harnischfeger Corp.
Jaeger Machine Co.
Link-Belt Co.
Northwest Engineering Co.
Pioneer Gravel Equip. Mfg. Co.
Sterling Machinery Corp.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Cleveland Rock Drill Co.
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Thermoid Rubber Co.
Worthington Pump & Machy. Corp.

Hose Couplings (See Couplings—Hose, Pipe, etc.)

Hydrators
Blaw-Knox Co.

Kilns (Shaft)
Arnold & Son
Hardinge Company, Inc.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Bonnot Company
Hardinge Co., Inc.
Manitowoc Engineering Wks.
F. L. Smidth & Co.

Kominuters (See Mills)

Laboratory Crushers
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Lamp Guards
Flexible Steel Lacing Co.

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Hardinge Co., Inc.
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

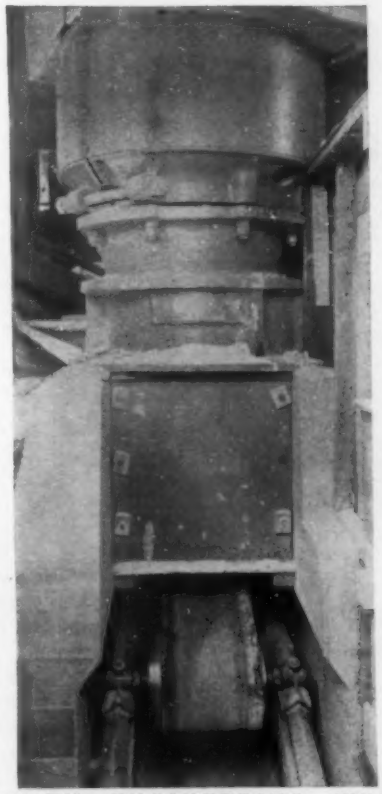
Lime Kilns (See Kilns and Coolers, Rotary)

If you are using a Telsmith Crusher purchased between Jan. 1923 and Jan. 1931**

A NEW *MODERNIZATION* SERVICE BY TELSMITH *INCREASES CAPACITY* OF YOUR PRESENT CRUSHER

25%

SPEEDS UP CRUSHING! . . . . . IMPROVES THE PRODUCT!



■ **Speed up! Increase your crushers' present capacity by 25 per cent! And get a finer and more uniformly cubical product at the same time.**

If your present Telsmith Primary Breaker or Reduction Crusher is over six years old,* and not older than thirteen years,* it can be completely modernized to give you these results . . . at a very moderate cost.

Modern Telsmith Crushers are operated at *much higher crushing speeds* . . . not merely multiplying gyrations per minute but promoting breakage by impact. Results — greater out-put and better cubing of the product, with less oversize. These speeds are made possible by such outstanding Telsmith engineering advancements as — *roller bearing countershaft, cut steel drive gears, improved oiling system*. These great developments may now be incorporated in *your* crusher.

This modernization service applies only to Telsmith *steel* crushers — introduced by Telsmith as standard design in 1923. Because cast iron and semi-steel crushers are vulnerable to breakage by tramp iron, we do not recommend that older crushers be operated at modern high speeds. *It will pay you to write for full facts and details.*

**In Jan. 1923 Telsmith adopted steel construction. In Jan. 1931 Telsmith current high-speed models were announced.*

HS-2

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE, WIS.

Associates in Canada: Canadian Ingersoll-Rand Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver

50 Church St. New York City
201 N. Wells Chicago, Ill.
1013 Commercial Trust Bldg. Philadelphia, Pa.
81 Binney St. Cambridge, Mass.
412 Westinghouse Bldg. Pittsburgh, Pa.
Abrams-Anderson Co. Detroit, Mich.

TELSMITH

Classified Directory—*Continued*

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Chutes, Ball and Tube Mills, Tank and Pipe)
B. F. Goodrich Co.

Loaders and Unloaders
Barber-Greene Company
Bucyrus-Erie Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Northwest Engineering Co.
Robins Conveying Belt

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel Electric)
Davenport-Besler Corp.

Locomotives (Diesel Mechanical)
Davenport-Besler Corp.

Locomotives (Gas-Electric)
Davenport-Besler Corp.
Jeffrey Mfg. Co.

Locomotives (Storage Battery)
Jeffrey Mfg. Co.

Locomotives (Steam, Gas and Electric
Davenport-Besler Corp.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Gulf Refining
Socony-Vacuum Oil Co. Inc.
Texas Company

Lubricants (Wire Rope)
Broderick & Bascom Rope Co. (Yellow Strand)

Machine Products Engines (Gasoline)
Continental Motors Corp.

Machinery Guards
Harrington & King Perf. Co.

Magnetic Pulleys
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Manganese Steel Castings
American Manganese Steel Co.
Frog, Switch & Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Manganese Steel Parts
American Manganese Steel Co.
Taylor-Wharton Iron & Steel Co.

Material Handling Equipment
Jeffrey Mfg. Co.

Mechanical Rubber Goods
B. F. Goodrich
Thermoid Rubber Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
Carnegie-Illinois Steel Corp.
Hardinge Company, Inc.
Jeffrey Mfg. Co.
F. L. Smidth & Co.
Traylor Engineering & Mfg. Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bonnot Company
Bradley Pulverizer Co.
Day Pulverizer Co., Inc.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Mine Handling Equipment
Chain Belt Co.

Mixers (Commercial Concrete)
Jaeger Machine Co.

Mixers (Concrete)
Anchor Concrete Machy. Co.
Besser Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jaeger Machine Co.
Koehring Co.
Multiplex Concrete Machy. Co.

Mortar Colors
Geo. S. Mepham Corp.
Tamms Silica Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Harnischfeger Corp.

Motor Trucks
Hug Company

Multiple V-Belt Drives
Worthington Pump & Machy. Corp.

Nozzles (Gravel Washing)
Chain Belt Co.

Nuts (Lock)
Standard Pressed Steel Co.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Oils (Lubricating)
Gulf Refining Co.
Socony-Vacuum Oil Co. Inc.
Texas Company

Packings (Pump, Valve, etc.)
B. F. Goodrich
Goodyear Tire & Rubber Co., Inc.
Thermoid Rubber Co.

Paint (Asphalt)
Texas Company

Pallets
Anchor Concrete Machinery Co.
Besser Mfg. Co.
Commercial Shearing and Stamping Co.
Miles Mfg. Co.
Multiplex Concrete Mfg. Co.
Stearns Mfg. Co.

Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Joseph T. Ryerson & Son, Inc.
Taylor-Wharton Iron & Steel Co.

Pipe Machines
Besser Mfg. Co.

Pipe Molds (Concrete)
Besser Mfg. Co.
Stearns Mfg. Co.
Universal Concrete Pipe Co.

Plants (Crushing)
Good Roads Machinery Corp.
Traylor Engineering & Mfg. Co.

Plants (Sand and Gravel)
Good Roads Machinery Corp.
Traylor Engineering & Mfg. Co.

Plants (Stone Crushing)
Traylor Engineering & Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
Barber-Greene Company
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.

Portable Crushing and Screening Unit
Pioneer Gravel Equip. Mfg. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Portable Loaders
Geo. Haiss Mfg. Co., Inc.
Jeffrey Mfg. Co.

Powder (Blasting)
Atlas Powder Co.
Hercules Powder Co.

Power Tampers
Besser Mfg. Co.

Power Transmission Machinery
Chain Belt Co.

Power Transmission Equipment
Standard Pressed Steel Co.

Power Units (Gasoline)
Continental Motors Corp.

Precipitators, Electrical
Western Precipitation Co.

Pulleys
Huron Industries, Inc.

Pulleys, Magnetic (See Magnetic Pulleys)

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Day Pulverizer Co., Inc.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Acid, Centrifugal)
Worthington Pump & Machy. Corp.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
Allen-Sherman Hoff Co.
The Dorr Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allen-Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Jaeger Machine Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
Allen-Sherman Hoff Co.
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons
Worthington Pump & Machy. Corp.

Quarry Bars
Worthington Pump & Machy. Corp.

Racks or Decks for Lift Trucks
Besser Mfg. Co.
Chase Fdry. & Mfg. Co.

Ready Mixed Concrete Plants
Blaw-Knox Co.
Jaeger Machine Co.

Ready Mixed Concrete (Truck Mixer Bodies)
Blaw-Knox Co.
Jaeger Machine Co.

Reciprocator Feeder for Unloading Hopper Bottom Cars
Besser Mfg. Co.

Recovery Plants (Dust)
W. W. Sly Mfg. Co.

Recuperators
Manitowoc Engineering Wks.

Road Binder
Calcium Chloride Ass'n

Road Machinery
Barber-Greene Company
Blaw-Knox Co.
Harnischfeger Co.
Koehring Co.
Northwest Engineering Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Hardinge Co., Inc.

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Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Rope, Wire (See Wire Rope)

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Hendrick Mfg. Co.

Rubber Covered Screens
B. F. Goodrich Co.

Sack Balers
Besser Mfg. Co.

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W. W. Sly Mfg. Co.

Sand Drag
Smith Engineering Works

Sand Separators
Pioneer Gravel Equip. Mfg. Co.

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Jeffrey Mfg. Co.
Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
Smith Engineering Works

Scrapers (Power Drag)
Blaw-Knox Co.
Harnischfeger Corp.
Link-Belt Co.
Northwest Engineering Co.
Pioneer Gravel Equip. Mfg. Co.
Sauerman Bros., Inc.

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Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
The C. O. Bartlett & Snow Co.
Besser Mfg. Co.
Carnegie-Illinois Steel Corp.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Hardinge Co., Inc.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Ludlow-Saylor Wire Co.
New Holland Machine Co.
Nordberg Mfg. Co
Pioneer Gravel Equip. Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
John A. Roebling's Sons Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens (Revolving)
Geo. Haiss Mfg. Co., Inc.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Screens (Perforated
Hendrick Mfg. Co.

Screens (Testing)
Hendrick Mfg. Co.

Screens (Vibrating)
Good Roads Machinery Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co
Pioneer Gravel Equip. Mfg. Co.
Robins Conveying Belt Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Conveyors
Besser Mfg. Co.

Screw Rewasher (Single and Twin)
Smith Engineering Works

Screws (Cap, Self Locking, Set, Hollow Set)
Standard Pressed Steel Co.

Scrubbers, Washers
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
Hardinge Company, Inc.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works
Traylor Engineering & Mfg. Co.

Separators (Magnetic)
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Separators (Slurry)
F. L. Smidth & Co.

Modern science of blending soils opens new field to AGGREGATE PRODUCERS

MANY gravel, stone and aggregates plants are being equipped to supply ready-mixed, ready-to-apply stabilized road surfacing. Pronounced by officials "the greatest road discovery in years," this material opens a tremendous new aggregates market.

Soil scientists have adapted, and highway engineers have applied to road building, the properties of cohesion and friction to produce endurance, and firmness. Certain soils develop and retain their desirable properties when mixed with moisture-regulating Calcium Chloride and provide a stabilized road at very low cost.

Fortunately, most of the needed soils are available in or near regular pits and quarries. Much of the bulk consists of overburden soils and finer aggregates, often unsalable in commercial work except as "fill" dirt. Much of the equipment necessary for testing, grading, proportioning and mixing is already in the pits and quarries.

So it costs aggregate producers very little to get into this profitable business of supplying "stabilized soil mix." Bulletin number 34 tells how. Write for it today.

Above—A typical Michigan stabilized road.

Left—Pit operations using clay overburden, at New Hudson, Michigan.

Below—Sandwich Fairgrounds stabilized road De Kalb County, Ill.

Calcium Chloride Association

Michigan Alkali Company, 60 E. 42nd St., New York City
Solvay Sales Corporation, 40 Rector St., New York City
The Columbia Alkali Corporation • Barberton, Ohio
The Dow Chemical Company Midland, Michigan

CALCIUM CHLORIDE

FOR STABILIZING ROAD SURFACES

Classified Directory—*Continued*

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Co.
Michigan Power Shovel Co.
Northwest Engineering Co.
Thew Shovel Co. (Crawling Tractor)

Shovel Repair Parts (Manganese)
Taylor-Wharton Iron & Steel Co.

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Special Aggregates
Tamms Silicon Co.

Speed Reducers
Huron Industries, Inc.
Link-Belt Co.

Sprockets and Chain
Chain Belt Co.
Jeffrey Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Steel, Abrasion Resisting
Joseph T. Ryerson & Son, Inc.

Steel Bars
Timken Roller Bearing Co.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timker Roller Bearing Co.

Steels, Drill (See Drill Steel)

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Strippers
Besser Mfg. Co.

Stucco Materials
Geo. S. Mepham Corp.

Tanks
Combustion Engineering Corp.
The Dorr Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Worthington Pump & Machy. Corp.

Thickeners
The Dorr Co.
Hardinge Co., Inc.

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Besser Mfg. Co.

Tires and Tubes
B. F. Goodrich Co.

Track Equipment
Carnegie-Illinois Steel Corp.
Nordberg Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co.

Trailers, 3-way Dump
Athey Truss Wheel Co.

Tramways (Aerial Wire Rope)
Broderick & Bascom Rope Co. (Yellow Strand)
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trenchers
Barber-Greene Company

Truck Bodies (Dump)
Athey Truss Wheel Co.

Truck Bodies (Ready Mixed Concrete)
Blaw-Knox Co.
Chain Belt Co.
Jaeger Machine Co.

Trucks (Mixers)
Blaw-Knox Co.
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Loaders
Thew Shovel Co.

Underground Shovels
Nordberg Mfg. Co.

Valves (Air)
Cleveland Rock Drill Co.

Valves (Pump)
B. F. Goodrich Co.
Worthington Pump & Machy. Corp.

Vibrating Screens (See Screens, Vibrating)

Wagons and Trailers, Dump
Athey Truss Wheel Co.

Wagons and Trailers, Heavy Duty
Athey Truss Wheel Co.

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
The Dorr Co.
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Hardinge Copmany, Inc.
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Link-Belt Co.
Pioneer Gravel Equip. Mfg. Co.
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Broderick & Bascom Rope Co (Yellow Strand)
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Cable Co.
Broderick & Bascom Rope Co. (Yellow Strand)
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
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Wire Rope Slings (See Slings, Wire Rope)

Wrenches (Car)
Appleton-Atlas Car mover Corp.

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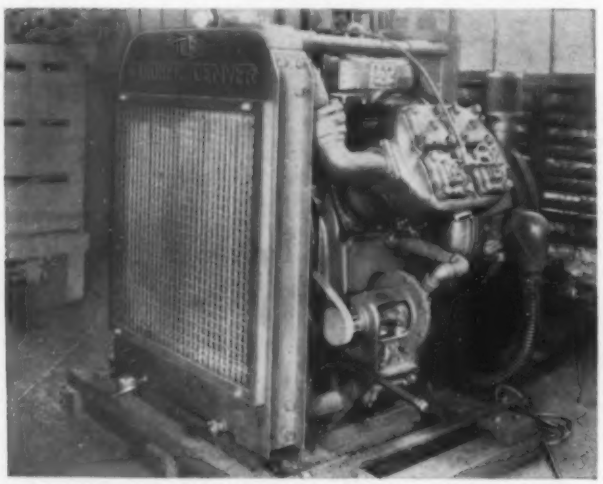
Gardner-Denver "WB" Compressor with combination radiator and intercooler.



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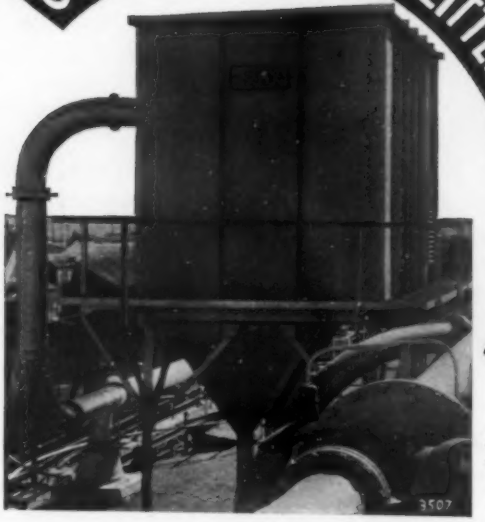
SINCE 1859

GARDNER-DENVER

SLY DUST CONTROL

COSTS LITTLE TO BUY, LITTLE TO OPERATE.



Sly Dust Filter on roof of cement silo.

LET us apply our thirty-eight years of experience to your dust control problem. Let us SHOW how the dust nuisance and a considerable loss of product can be ended at low cost.

The Sly Dust Filter, the heart of a Sly Dust Control System, is of simple and exclusive design for highest efficiency, lower first cost and lower maintenance cost. Dust is collected on the OUTSIDE of flat cloth bags. A compression spring keeps bag taut for most effective dust removal by a simple motor shaker.

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Write for Bulletin S-85, A COMPLETE TREATISE ON DUST CONTROL. It's yours for the asking.

CLOTH BAG
SLY Dust Filters
FOR DUST CONTROL
SUPPRESSION···POSITIVE COLLECTION···DISPOSAL

THE W.W. SLY MANUFACTURING CO.
4726 Train Ave., Cleveland, Ohio

CLASSIFIED ADVERTISEMENTS

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CONSOLIDATED GOOD USED EQUIPMENT

4—4'x8' Allis-Chalmers Screens, 2-deck, Texrope drive.
2—3'x6' Niagara Screens, 2-deck Texrope drive.
2—12x36", 3'x5' Jigger Screens, 2-deck.
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8—Tyler Hummer Screens, 3x5', 4x5', 4x7'; types 31, 27, 29, 32, 60.
2—Tyler V-32 Vibrators.
2—3'x6', 4'x5' Sturtevant M. V. Screens, 2-deck.

1—24"x36" Allis-Chalmers Jaw Crusher.
1—42"x48" Traylor UNUSED Jaw Crusher.
1—30"x42" Buchanan, Type C, sectional.
1—42"x60" Bacon Farrel Crusher.

4—6" & 10" Allis-Chalmers McCully Crushers.
3—20", 36" Allis-Chalmers Superior McCully Crushers
1—18x16" Pennsylvania Single Roll Crusher.
1—24x24" Jeffrey Single Roll Crusher.
3—30x16", 20x14" Sturtevant Crushing Rolls.
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3—3', 5', 10' Sturtevant Air Separators.
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1—6'x22" Hardinge Silex Lined Pebble Mill; also 8'x30" and 8'x72" unlined mills.
1—7'6"x5' Unlined Pebble Mill.
1—No. 32 Marcy Ball Mill.
2—6'x18' Hardinge Iron Lined Rod Mills.
4—5'x26', 6'x26', 6'x40' Class "A" Double Shell Ruggles-Coles Direct Heat Rotary Dryers.
10—Direct Heat Rotary Dryers; 2x30', 4x30', 5x50', 6x45', 6x50', 6x60', 8x60'.
8—Rotary Kilns; 6x60', 8x110', 8x125', 8'6" & 9'6"x150'.

Just a partial list.
WE WILL BUY A SINGLE MACHINE OR COMPLETE PLANT.
What do you wish to sell? Send us details.

CONSOLIDATED PRODUCTS COMPANY, INC.
15-16-17 Park Row **New York, N. Y.**
Plant and Shops at Newark, N. J., cover 8 acres of ground.

FOR QUICK DELIVERY

1—Link Belt 25' Belt Conveyor x 24".
3—2 and 3 drum 65-80 H.P. Elec. or Gas Derrick Hoists.
2—Indep. type Steam Swingers.
2—Steam Hoists—3 drum—8¼"x10" and 9"x12" with or without boilers.
1—2 yd. Jaeger Truck Mixer—4 cyl. engine—water tank, etc.
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2—C.P. Wagon Drills—Model 100.
23—120', 220', 360' Portable Compressors.
100—Air Tools, Rock Drills, etc.
15—⅜ to 1½ yd. Clamshell Buckets.
3—Byers "40" ⅝ yd. Shovel Crane and Backhoe combinations.
5—Northwest, Osgood, Byers and P&H ¾ & 1 yd. Cranes and Shovels.
2—½ yd. Full Revolve Gas. Crawler Shovels—overhauled and with crane booms, if required.
28—2", 3", 4", 6", 10" Gas and Elec. S.P. Cent. Pumps.
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1—Kern 1 Yd. Kern Drag Scraper Hoist.

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3—1250/1500 KW Westinghouse 3—Unit Motor Gen. Sets

Consisting of: 2—625/750 KW, D.C. Gen., 125 volt, coupled on each end of 1—1930 KVA Synch. Motor, 2200 v., 600 RPM, 1—22½ KW Type SK, 125 v., 600 RPM Exciter.

A. C. Motors

3 Ph. 60 Cy.

H.P.	Make	Type	Volts	Speed
550	G. E.	Synch.	2300/440	720
600	A1. Ch.	Synch.	440	450
500	G. E.	Synch.	440	1200
450	West.	Synch.	440	257
450	West.	S1. Rg.	2300	375/700
400	G. E.	S1. Rg.	2300/550	390
400	West.	S1. Rg.	2300/550	290
400	G. E.	S1. Rg.	440/220	505
400	West.	S1. Rg.	2300	514
400	G. E.	S1. Rg.	2300	835
300	A1. Ch.	S1. Rg.	2300/550	535
250	G. E.	S1. Rg.	4000/2300	257
250	West.	S1. Rg.	440/220	585
250	F. Morse	S1. Rg.	2300/550	1200
225	El. Machy.	Synch.	4150/2300	450
220	G. E.	Synch.	2300	900
200	West.	Synch.	440	514
200	West.	Synch.	2300/550	1800
200	West.	S1. Rg.	2300	870
200	West.	S1. Rg.	440/220	900
150	West.	Synch.	4000/2300	1800

BELYEA COMPANY, INC.
141 W. 18th St. **NEW YORK, N. Y.**

FOR SALE

Following equipment at bargain prices:

2—No. 66 Smidth Kominuters.
1—42" Fuller-Lehigh Mill; Shop No. 2123.
1—Gates type Allis-Chalmers Gyratory crusher No. 8; Shop No. 6431.
1—Simonds Disc crusher, type B, 36", Shop No. 154.
1—6'x60' Cooler or Dryer. Channel flights.
1—6'x50' Cooler or Dryer.
1—500 HP Freeman Bonus Water Tube Boiler. 287—4" tubes 20' long. Tubes in excellent condition.
1—4'x8'Traylor large size Sheridan Shaking Grizzley. Never used.
1—Jet Steam Condenser. Made by Deane Steam Pump Company. No. 57340. Size 12"x22"x24".
2—Steam Pumps, "Deane," size 7½"x 8½"x6". Serial Nos. 81900 and 62325.
1—Type B Jeffrey Hammer Mill, 24"x 36".
2—Type A Jeffrey Hammer Mills, 24"x 18".
1—Murrell Pipe Threading Machine No. 6½. Takes pipe from 1" to 6"; one set of dies; takes up to 2" pipe; good shape, ready for use.
1—Fay & Egan Band Saw No. 192.
1—No. 62 Universal Wood Worker; complete with all accessories. Several hundred pulleys of various sizes.

Write P. O. Box 3046, Houston, Texas

24x16 Crushing Rolls. 24x36 Jaw Crusher.
8x16 Universal Portable Crusher on Truck with Bucket Elevator.
42x28 Pennsylvania Hammer Mill.
No. 4 Jeffrey Combination Jaw Crusher and Pulverizer.

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53 W. Jackson Blvd. **Chicago, Ill.**

Good Equipment—Priced Right

1—Lorain 75A shovel, 1¼ yd., gas.
1—Northwest No. 7 crane, 1⅜ yd. capacity, 70' boom.
1—Osgood combination crane and shovel, 1¼ yd., gas.
1—Osgood steam combination crane and shovel, 1½ yd., 60' boom.
2—Osgood steam shovels, 1¼ yd. capacity.
1—Industrial Brownhoist, 15 ton gas crane.
2—Locomotives, gas, 20 ton, 36" gauge Whitcomb.
1—Locomotive, gas, 20 ton, 36" gauge Vulcan.
25—Dump cars, 5 yds., two-way, 36" gauge.
10—Dump cars, steel, V type, 3 yds., 36" gauge.
1—Batcher plant, Butler, 3 compartment, 125 yds. bin with weigh meters, cement bin, screw conveyor, complete.
1—150 yd., 3 compartment, steel storage bin, weigh meters.
1—100 yds., 3 compartment, steel storage bin, weigh meters.
50—Rock drills, DCR-23, X49, X59, S70, others.
10—Concrete breakers, pneumatic.
30—"BARRE" carving tools, Types BL, CL, DL.
1—Bucket elevator, 32'.
1—Air compressor, 1050 CFM, Worthington, electric motor drive.
1—Air compressor, IR, Imperial Type, 1260 CFM, electric motor drive.
2—Air compressors, 534 CFM, short belt drive.
1—Screen, Telsmith, vibrating, 4'x12', 5 HP. motor.
1—Storage bin, 500 yds., steel portable, 4 compts.
1—Sauerman 75 HP. double drum gas dragline hoist.
2—Derricks, steel stiff leg, 15 tons capacity, 100' booms.
4—Derricks, steel, guy, 7½ tons capacity, 75' booms.
1—Ingersoll Rand, No. 50 Leyner drill sharpener.
1—Clyde 3 drum, attached swinger, 75 HP. electric hoist.

Also buckets of all kinds, steam hoists, electric hoists, gas hoists, steel blocks, etc.

RICHARD P. WALSH CO.
30 Church St. **NEW YORK CITY**

1—36"x42" Farrell Jaw Crusher.
1—24"x36" Farrell Jaw Crusher.
2—12"x24" Farrell Jaw Crusher.
1—12" Kennedy Gearless Gyratory Crusher.
1—No. 32 Telsmith Gyratory Crusher.
1—12"x32" Jeffery Jaw Crusher.
1—1030 Good Roads Roller Bearing Jaw Crusher.
1—1020 Good Roads Roller Bearing Jaw Crusher.
1—16"x36" Buchanan Jaw Crusher.
1—3'x10' Telsmith Triple Deck Vibrator Screen.
1—4'x6' Kennedy Scalping Screen.
1—18-ton Howe Scales.
1—120' Schremm Compressor.
1—10S Rex Mixer—like new.

BLUE BALL MACHINE WORKS
Blue Ball, Pa.

Rebuilt, ⅝ to 1-yd. P. & H. 206 gas cat. dragl.-crane, 40' boom, like new, $3600.
⅝-yd. 10-B, Bucyrus-Erie shovel, used 5 mos.
½-yd. type A, Erie full rev. steam cat. shovel, working O.K. now; $850.
New, but not latest model, ⅝-yd. Orton gas cat. crane, 40' boom; has never left Ind. factory, guaranteed; 40% price reduction to $4875.
7x10 American steam D.D. hoist and boiler, $375.
2-yd. late model Northwest gas shovel.
P. & H. 700 crane, 100' boom, bucket, little used.
⅝ to ¾-yd. No. 1 Koehring comb. shovel-crane, 40' boom, bucket; $3300.

H. Y. SMITH CO. **Milwaukee, Wis.**

Marion Electric Cat. Shovels & Drags, 1⅝-1¼ yd.
Link-Belt 2 yd. Diesel Shovel-Crane-Dragline.
Monighan 3W Full Diesel Dragline, 75' boom, 3 yd.
Gas Locomotive Crane—7½ ton capacity, std. gage.
Gas Cat. Crane, ⅝ yd., 35-50' boom, $1250.
Universal Truckcrane—Mounted on 6-wheel truck.
Gas Cat. Crane, 3 ton cap., 50' boom, full rev.
Sauerman Outfits—⅜ to 5 yds.; Hoists, Buckets, Crushers—6x36 to 8x8 jaw; 36" to 4' gyratory; mse. Hammermills, Ball Mills, Rolls, etc., etc.

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FOR SALE: Two Chicago Pneumatic Diesel driven air compressors, 492 cubic feet, size 16½"x11"x18", Class N.S.O.-2. Serial No. 18292 and No. 18293; $3500.00 complete.

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925 Market St., Paterson, N. J.

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(Whole or in Part)

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1 36x52" Buchanan Crusher.
2 Gyratory Reduction Crushers, 10" Opening.
1 3x9', 3-deck, Niagara Vibrating Screen.
1 350-hp. G-E Slip-ring, Induction Motor.
1 Continuous type Bucket Elevator, 70 ft. Centers, 19½" Buckets.

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1 K-B-2 Hammer Mill.
1 24" Symons Disc Crusher.

Equity Equipment Corp.
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Jaw Crushers—4"x8" up to 66"x84".
Crushing Rolls—16"x10" up to 54"x24"—Gyratory Crushers—No. 3 up to 42".
Ring Roll Mills — No. 1½ and No. 1 — Swing Hammer Mills.
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Direct Heat Rotary Dryers—4'x30', 5'x50', 5½'x35', 6'x60', 3½'x25', 8'x50'.
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New dryers made for all purposes.
5' & 30" air separators—screens.

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1—10x20 Climax Jaw Crusher.
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1—66"x84" Allis-Chalmers, Superior Type, Jaw Crusher, with 300 HP. Motor and V-belt drive.
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Portable and stationary, belt with elec. or gas. power, sizes from 21 cu. ft. to 1,000 cu. ft.

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1—4-yd. Hayward Class "G" Clamshell.
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Large lot, including std. ga. 6- and 12-yd., and 20-yd., 36-in. ga. 5-yd., and 24-ga. 1½-yd.
16—2-yd. 36-in. ga. Continental 2-way wood body dump cars.

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1—Koehring model 501 dragline, ser. No. 1070, 45' boom, 1¼-yd. bucket.
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1—Allis Chalmers Size No. 6, Style N; openings 12"x44".
1—Allis Chalmers Size No. 5 Gates Gyratory, No. 5331, openings 10"x36".
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1—18"x36" Farrell Bacon Jaw Crusher, size No. 12-B with 75 HP motor.
1—Climax No. 2½ Jaw Crusher, 10"x20", No. 2637.
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1—25-ton Clyde, all steel Stiff Leg Derrick with 50' boom, 30' mast, legs and sills in proportion, 12' dia. bullwheel, for hook work or clamshell operation.
1—15-ton Clyde, all steel Stiff Leg Derrick, 50' boom, duplicate of above.
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1—15-ton Clyde, all steel, "A" frame, barge derrick with 50' boom, 30' mast, 12' dia. bullwheel, for hook work or bucket operation.
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The Mt. Vernon Sand and Gravel Company
1 Reeves Gas Engine, 150 H.P., including a General Electric Generator, Exciter and Pump. This is a 440-volt Generator, 120 KVA alternating current. Price $2,500.00.
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Mt. Vernon Sand and Gravel Co.
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10x18 Reliance, Pulverizer Type.
7½x13, 9x16, 10x20 and 11x26 Std. Makes.
48x36, 36x18, 30x13, 15x9 and 20x6 Farrels.

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8'x22" Hardinge Conical Pebble Mill.
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Shovels, Diesel, 3½-yd. steam, 2-yd. elect., 2-yd.
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Model 70 Marion Steam Shovel

2½ yard bucket, excellent condition, sell cheap, can be seen at Osborn, Ohio.

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Heavy Steel Structure, 25′x58′x70′ high.
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With distribution chutes to:
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Equipped for both truck and car loading.

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Five-Roll Low-Side Raymond Mill.
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5′x36′ Direct Heat Revolving Dryer.
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10-ton Dravo Steam Whirler.
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Athey side-dump rock wagons, 14-yd.
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1—Double Pumpcrete Machine.
3¼-yd. P&H Diesel Shovel, Model 900.

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1—75-B, 1½-yd. **Gas Shovel**
1—75-B, 1¼-yd. **Gas Shovel**—Dragline 55′ boom, 1-yd. bucket.
1—104 **Northwest Crane**—50′ boom
1—50-B **Bucyrus Deisel Dragline**
1—50-B **Bucyrus Steam Shovel**
1—50-B **Bucyrus Steam Crane**
1—21-ton, 11x16, Std. Ga. **Davenport Loco.**
6—21-ton, 11x16, Std. Ga. **Vulcan Loco.**
2—25-ton, 12x16, Std. Ga. **Davenport Loco.**
1—28-ton, 12x18, Std. Ga. **Vulcan Steam Loco.**
2—38-ton, 14x22, Std. Ga. **American Steam Loco.**
4—50-ton, 17x24, **Davenport, 6-wheel Switchers**
2—No. 8-C **Brewning Steam Locomotive Cranes**
12-yd., 16-yd., 20-yd., 30-yd. standard gauge **Dump Cars**
General Construction Equipment

CLAPP, RILEY & HALL EQUIPMENT CO.
14 North Clinton St., Chicago, Illinois

FOR SALE—Two second-hand 24-inch Rogers Jaw Blake-Type boulder crushers. Size of opening 14″x24″. Good condition. Price $550.00 each.

Miami Rock Products Company, Miami, Oklahoma.

CONSULTING ENGINEERS

USED EQUIPMENT WANTED

WANTED

No. 3 Clyde Hydrator
No. 1 Raymond Beater Mill with Air Separator
6 Steel Cased Single Chain Elevators 10" & 12" buckets
24" Apron Conveyor, 30 to 40 ft.
12-1½ yd., 36" ga. V Dump Cars

W. H. FRIEND, M.E.

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WANTED TO BUY OR RENT

Used sewer tile forms up to sixty inches.

DANIEL J. MAHONEY

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WANTED:

One 30", or smaller, SYMON Cone-Crusher, for crushing reasonably soft sandstone, and capable of reducing to sand in a single operation. In answering, please give full description, condition, and best cash price f.o.b. cars, Whitwell, Tennessee.

WHITWELL SMOKELESS FUEL CO.

1018 Chattanooga Bldg. Chattanooga, Tennessee

WANTED

Three or Four Foot, Coarse Bowl Type, "C" Feed Opening, Symons Cone Crusher.

Address Box 792, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

POSITIONS WANTED

CAN YOU USE THIS MAN?

American, 44 years old, 20 years' experience building and operating Sand and Gravel Plants. 10 years with one concern. A willing, conscientious worker with a proven record of efficiency in handling labor and equipment. Will take any job that offers advancement. Location immaterial, starting salary secondary. Unquestionable references. Box 793, Rock Products. 205 W. Wacker Drive, Chicago, Ill.

POSITION WANTED AS QUARRY FOREman with a progressive company. Years of experience with large cement companies and limestone quarries; qualified to get out rock for rip rap or dam construction work; familiar with all modern equipment; capable of taking full charge of any size plant; references; open for engagement. George Horton, Gladstone, Illinois.

RESEARCH ENGINEER, M.E., American citizen, single, employed, six years as physical chemist, grinding plant and burning research in large cement plant. Experience in inorganic chemistry, physical testing, combustion and fuel engineering, drafting, economic investigations. Desires permanent position in industrial or research work in a progressive organization, cement preferred. Address Box 751, care of Rock Products, 205 W. Wacker Dr., Chicago, Ill.

POSITION WANTED—COLLEGE GRADUate, B.S. in Chem., 16 years home and foreign experience as chief chemist, assistant to general manager; desires like position in progressive company; thoroughly familiar with all phases cement manufacture, research, development new product, etc.; excellent references; immediately available. Address Box No. 791, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

SUPERINTENDENT: DESIRES CONNECtion with active unit of the stone crushing industry; have spent over twenty-five years in this industry as superintendent, manager, and owner; thoroughly familiar with all angles of industry and low cost of production and efficiency; open for immediate engagement. Address Box No. 783, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

SUPERINTENDENT — First class highly capable man with A-1 reference wishes permanent position with responsible Limestone or Trap Rock company where real ability, loyalty and conscientious efforts will be recognized. 20 years' experience operating limestone quarries and crushing plants. Complete knowledge of all modern equipment; qualified to assume full charge of any size plant. Open for engagement. Box 789, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

POSITION WANTED—EXECUTIVE POSItion wanted by an American graduate engineer, with twenty years' experience in the operation, design and construction of wet and dry cement plants, including experience in quarrying and mining. At present employed, but seeking a connection presenting a better opportunity. Address Box No. 794, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

FACTORY MANAGER, SUPERINTENDent, 37, personable, capable executive, seeks position with future any field where architectural-engineering training and experience as head of concrete products company will be of value; handle correspondence, details, contacts. Address Box 795, care Rock Products, 205 W. Wacker Drive, Chicago, Ill.

BUSINESS OPPORTUNITIES

FOR SALE

Sand and Gravel Plant ready for operation, near Asheville, North Carolina, directly adjacent to two railroad lines. Nearest source of sand 300 miles. Placer gold in deposit should pay operation costs. Owner too far for management. Willing to sell controlling interest. Communicate.

J. R. LANE

Shorewood Hills, Madison, Wis.

IMITATE MARBLE

with Crystal Cement; Mixed with water, sets solid in 30 minutes. For interior or exterior. For Ceilings, Walls, Ornaments, Casts, Slabs any size or shape. Pure glistening white. Waterproofed and stain proof. Does not warp, nor crack or hair-line. Unlimited uses for this material is concrete hardness. Can wash clean any way, stands Freezing as well as very hot, is weather proof. Free Samples. COWELL INSTITUTE, Grayling, Mich.

FOR SALE

Sand and gravel operation, good reason for selling, located in central Ohio.

BOX 768, ROCK PRODUCTS

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SLATE—FOR SALE

At far below cost substantial inventory of slabs of slate ⅝" thick and varying in size from one to five square feet. Detailed inventory furnished on request.

The Maine Manufacturing Company

Nashua, New Hampshire

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DESIGNED TO CUT OPERATING COSTS

follow the trend

LIMA

Photograph shows one of two LIMA shovels owned by Martin Wunderlich Co., Jefferson City, Mo., working near Idaho Springs, Colorado.

A definite and important part has been played by LIMA in the advancement of power excavator design. LIMA was first to introduce anti-friction bearings at every vital bearing point.

Later, efficient helical cut gears replaced the old-fashioned spur gears.

To these two important features were supplemented spline shafts, square lever shafts, synchro-power clutches and many other important advantages, all of which, when combined, result in a quiet, economical and smooth running excavator that lowers operating costs and increases production on any construction or material handling job requiring shovels, draglines or cranes. ● ● ●

LIMA LOCOMOTIVE WORKS, Incorporated, Lima, Ohio, U. S. A.

SHOVEL AND CRANE DIVISION

NEW YORK, N. Y. · CHICAGO, ILL. · NEWARK, N. J. · MEMPHIS, TENN. · LOS ANGELES, CALIF.

SAN FRANCISCO, CALIF. · SEATTLE, WASH. · DALLAS, TEXAS · Texas Machinery Company, Ltd., Vancouver, B. C. · The Quinnell Supply Co., of Canada, Ltd., Ottawa, Ont.

SHOVELS - DRAGLINES - CRANES

"Only God can make a tree" . . . but men can save it

A typical example of Goodrich development in rubber

THIS is one of seven trees planted a century ago by Thomas Jefferson at his Monticello home. All seven trees were dying of rot.

A famous expert, who was called in, had been trying to develop a new special treatment to save trees. He conceived the use of rubber to keep air and water out of the tree wounds after the rot is scraped away. He reasoned that rubber would flex and so let the tree "exercise" by its normal bending and twisting; rubber would help growth of wood and bark around the scar because it would not chafe tender new growing cells; rubber would form a permanent seal; rubber would do away with unsightly scars because it could be made to simulate actual bark.

The expert came to Goodrich with his idea. Rubber as ordinarily made would never do, but Goodrich engineers had been developing rubber compounds with the needed properties, in their research for many Goodrich products. For outdoor conveyor belts in gravel pits they had developed a rubber which resists air, sunlight, water, temperature changes. For rubber window channels in automobiles they had found a rubber with remarkable ageing qualities.

With this experience and these compounds, Goodrich engineers soon had the rubber needed. It works perfectly, provides absolute protection to the tree, and as this is written, Thomas Jefferson's trees are being saved, with this new Goodrich development. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.